

COMPUTER WORLD

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Hopes Dim for RCA Division

Hopes that RCA's Computer Systems Division would be preserved intact by another computer manufacturer were all but dead by last Friday.

Xerox and Control Data both said flatly last week that they were not interested in buying the division, although Xerox indicated it might be interested in some pieces of it.

Univac said it had informally talked to RCA "to explore the areas of mutual interest in the disposition of discontinued business."

Meanwhile, RCA's some 9,200 remaining employees were told Thursday that a decision would be forthcoming by Friday, Oct. 8, on whether to sell it off piecemeal.

Some RCA users have reacted to the uncertainty by ordering additional systems, figuring to get equipment while they can.

The most worried RCA customer is Siemens, the German computer manufacturer, for which RCA makes mainframes. If RCA (or a successor) doesn't agree to continue to supply Siemens, the company must somehow keep the RCA West Palm Beach mainframe factory operating, find another supplier, or start making the mainframes itself.

Users Must Fend for Selves After RCA Contracts Expire

By Michael Merritt
OF THE CW STAFF

NEW YORK As far as software, systems support and maintenance, and education go, RCA users will have to fend for themselves after the expiration of current contracts.

This was the bomb dropped by RCA Chairman Robert W. Sarofin in a letter to users that was being delivered last week. Corporate instructions were that the letter be delivered personally by Account, Regional, or Sales

Managers, but most users still had not received Sarofin's statement late in the week.

Sarofin said the company "will review with [individual users] your requirement for the programming systems and maintenance, systems engineering support and

ware maintenance would continue indefinitely. Some users weren't pleased about the prospect of returning to maintenance by RCA Service Co. however. Computer maintenance has been done by the computer division for the last two years.

Sarofin also said that sales

Firm Offers to Help Users

OAKLAND, Calif. — Computer Synergy, Inc., a facilities management firm, has offered to organize a special interest RCA users group of users concerned with conversion problems. Synergy official Philip Carville said his firm was mailing information on this effort to all the RCA users they know.

The purpose of the group will be to act as a clearinghouse for information on converting from RCA equipment to computers made by other vendors. They also hope to gather data on the impact of RCA's new policies, and on the technical and economic alternatives to RCA equipment.

Computer Synergy is at 8105 Edgewater Drive, Suite 112, 94621.

educational services) that are needed to fulfill our contractual obligations. We will then certify... our program to meet [these] needs."

The RCA chairman said hard-

men would be taking their final firm orders, and future demand for equipment would be supplied by recycled units, rather than new production runs.

(Continued on Page 4)

Software, Support Shortcomings Seen Computer's 'Achilles Heel'

By Alan Drattell

CW Washington Bureau
WASHINGTON, D.C. The Achilles heel of the computer industry is software and the technological support systems, Dr. Ruth M. Davis, director of the National Bureau of Standards' Center for Computer Sciences and Technology, told a House subcommittee recently.

"At this moment in the computer history," she told the Subcommittee on Science, Research Development, "such supporting systems and software have become the Achilles heel in all our efforts to channel the power of computers to serve our best interests."

The supporting systems include legal, economic, administrative, ethical and intellectual arrangements through which

computer power is made available to customers.

The use of computers overall, she said, has given rise to widespread problems which are going to be extremely costly to the U.S. economy.

These problems are quality control of computer services, software management, sharing of expensive computer resources, dissipation of costly computer manpower skills, a marketplace without adequate performance measures or standards, and automation without versatility, Davis noted.

The subcommittee is charged with legislative jurisdiction of National Bureau of Standards (NBS) and has been conducting hearings to get an overview of the agency's activities.

The role of the center is that of

"conscience of the computer world." Davis said, stressing that the principal responsibility is to serve the federal computer user as well as the individual citizen user. He becomes a computer user or a recipient of a computer's services.

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Polls-to-Processor

On-Line Computer Vote Planned

By Edward J. Brinde
OF THE CW STAFF

TAMPA, Fla. The Hillsborough County supervisor of elections wants to take the paper out of computerized voting, and he plans to test an on-line voting

system in the Florida presidential primary election March 14.

Although some officials are doubtful that all the red tape can be cut between now and next March, there appears to be little technical difficulty in writing the software, according to Dan Sutton, director of the county's DP center.

The county is working with General Electronics and Electronics to develop hardware plans. James Sebasta, the supervisor of elections, is charged with red-tape-cutting, and is optimistic that the necessary studies, finances, and permissions will allow the experiment.

Touch-Tone telephones will be installed in three of the county's 109 precincts for the March primary. Voters will be handed a relatively simple ballot, and will "key in" their choice directly to the county DP center, where twin IBM 360/40s will record and tally the votes.

Totals at Voting Close

Actually, one of the 40s will be dedicated to its application all day, so that "at 7:01 p.m., we'll have the results," Sebasta said.

Software will be written so that intern totals will be impos-

sible to create, Sebasta added. He also said observers would be assigned to assure security and operational procedures are followed correctly.

Sutton said his staff has not begun the programming chores yet, but he anticipated no delays. Since the proposal has officially been approved. There are "several hurdles," he noted, including cost analyses, feasibility studies, and administrative approvals.

No "hurdles" will be presented by his center, he added.

(Continued on Page 2)

Congress Debates Rap Sheet Use

By Alan Drattell

CW Washington Bureau
WASHINGTON, D.C. The deadline for computerizing arrest records is fast approaching, and Congress is being besieged by eleven-hour bills to either tighten or loosen controls on the data.

The FBI's plan to add "rap sheets" to its already-operating National Crime Information Center (NCIC) calls for Nov. 1 implementation of the new, large crime application. The legislation reflects concern over both the restrictions on the data and the adequacy of privacy

safeguards. The Senate is being asked to overturn a District Court's ruling in the Menard Case [CW, June 23]. The decision has prevented the FBI from distributing arrest records from its files, outside the

Spotlight Report

government, except for law enforcement purposes. And identical bills, suggested by the Department of Justice, would facilitate and regulate the exchange of criminal justice information and insure the secur-

ity and privacy of these systems. All these moves are intended to waste the effectiveness of the new system and ameliorate public concern over the data banking of criminal information which some feel may be inaccurate or incomplete.

The Menard case involved a state which sought to have his arrest purged from local police and FBI files. Distribution of arrest records to potential employers or non-police agencies would violate a person's right of privacy, Menard contended in his suit in District Court.

Sensors Alan Bible and Howard Cannon (both D-Nev) introduced legislation that would permit the Attorney General to exchange criminal information with certain state and local

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Flash Flood Hits Merrell Center

By a CW Staff Writer
READING, Ohio — The call came at 4 a.m. on a Sunday.

Joseph Walkes, regional marketing manager of Computer Leasing Co., answered the phone in his home in Cherry Hill, N.J. Just three hours earlier, he was informed, a flash flood had all but destroyed the contents of the computer room at the William S. Merrell pharmaceutical plant in Reading, a suburb of Cincinnati. The water had risen to a depth of about four feet in the room.

Lowell Thomas, DP manager at the plant, attributed the flood to a real quirk in building design. Thousands of gallons of water poured into his center through a tunnel that connected two buildings.

The DP center contained \$862,889 worth of IBM equipment on lease from Computer Leasing Co. (CLC) and included an IBM 360/40, a 1403 printer,

2540-1 card reader/punch, and a 2314-1 disk drive. Tape drives, also damaged, had been supplied directly by IBM. Walkes, CLC's regional marketing manager, contacted several management people at CLC and by 11:30 the next morning the leasing company had pieces of the system allocated for placement at Merrell.



Clean up nearly complete here, the Merrell center was back in operation in a week.

By the following Saturday, a week after the disaster, a new system was up and working at the user site.

"We had to replace the 40 with a 360/50 temporarily, however," said Ward T. Shields, CLC's equipment manager. "We didn't have a 40 available in inventory but we were able to divert a 50 enroute to a Chicago customer for Merrell."

The Chicago company had given its consent to the transaction and agreed to have a 360/65 installed there instead.

Shields added that as soon as a 40 becomes available it will replace the 50. In the meantime, Merrell is not paying any more than its original monthly tab. A 50 would cost about \$10,000 a month more in rental charges, Shields said.

Fortunately for Merrell, Manager Thomas had made previous backup arrangements with another company, but shortening his three-shift operation into the one shift plus available time slot did cut operations to basic invoicing and inventory control. Thomas, operating under multiprogramming, said the use of the 50 was now helping him catch up.

He also had maintained copies of tapes at another site which was not affected by the flood.

Computer Hardware Consultants and Services, Inc. is now repairing the damaged equipment. CHC estimates it will be finished in 90 days, at a cost of \$150,000 to \$200,000.

Computer Vote Slated for Florida

(Continued from Page 1)

Sutton and Sebasta both expressed intentions to run the experiment in parallel. That is, the telephones may be equipped with a card-punch mechanism, so voters can create hard-copy backup for later comparison with the computer counts.

The paper copies would be turned in as the voters leave the polling places, much as paper ballots are currently handled. They would be counted after the computer totals are known, and compared for validation of the system's accuracy.

The elimination of paper is seen as a positive point by both Sebasta and Sutton. Both are also aware of problems encountered with computerized voting in other locations, and expressed awareness of confidentiality requirements.

Sebasta said that, once the software for this sample ballot is written, it would be only a matter of modification for full elections. Sutton agreed that this "limited" use could be developed for testing next March.

The data processing director added that a primary election, with relatively little at stake, and with only limited uses, would provide an excellent testing ground for such a system.

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NASHUA

360s Tied-In to Spectras

Hodgepodge Checks N.Y. Credit

NEW YORK — IBM 360/40s and RCA Spectra 70/45s talk to each other in a three-way tie-up of computer centers at First National City Bank, Eastern States Bank and Association, and Marine Midland Bank's update computer center in Syracuse.

The network, now operative, makes it possible to provide bank charge card credit status information to participating merchants in seconds on any of the thousands of MasterCard cardholders in New York State.

The computer system links together three 360/40s, two Spectra 70/45s, and a 360/50 to provide a common pool of information.

The linking of the data centers was a project involving Marine Midland Service Corp., Omniswitch Corp., IBM, RCA, and the New York Telephone Co.

Several methods of handling data exchange were tried (phone, leased wire, CRT interchange) but rejected until the establishment of Omniswitch, a central authorization center using a computer to direct requests for information to the appropriate cardholder file. The Omniswitch 360/40 acts strictly as a switching point for merchant calls.

The 360/40 directs the request to the appropriate computer, which determines if authorization can be made. It sends the response back to the Omniswitch computer which directs it for display on the authorizer's CRT.

Tying-in Marine Midland's RCA computer to the IBM equipment at Omniswitch was complicated. The IBM computer used binary synchronous transmission and RCA used Ascl.

IBM, however, offers a modification to its transmission system which is half IBM and half Ascl that can be used with appropriate software to allow computer-to-computer communication between nonrelated computers. Omniswitch agreed to adopt this modified transmission code and RCA, in collaboration with Marine Midland, supplied the necessary modifications to the software.

The software is in two forms: a controlling program to operate an RCA 656 single channel controller at the Marine Midland end that communicates with its IBM 2703 controller counterpart at Omniswitch, and a program to enable the 656 to read transmission coming in the other direction. Similar programs were written for the IBM equipment after lengthy discussions among Marine Midland, Omniswitch, IBM, and RCA representatives. The programs are now complete.

pletely operational.

Among the problems solved were: determining how the hardware would transfer information; what control codes they would send back and forth to each other; when they would send certain codes, and under what conditions they would send them. The solution produced a common language between the two computers and a common format for information that could be used in both systems.

RCA wrote the control programs to get data in and out of the Marine Midland computer. Marine Midland wrote the program to handle the data once it got in; i.e., when a message is accepted, there is a program that looks at what the message is and determines the course of action to be taken.

New York Telephone Co. technical representatives worked closely in establishing the network, since the RCA and IBM controllers are linked by telephone line. A 2,400 bit/sec line was provided for interface.

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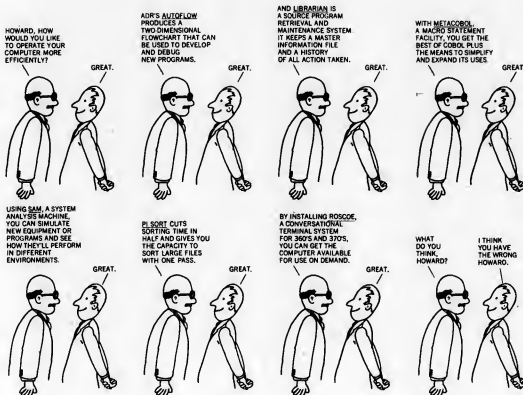
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That's Safe

Meinecke-Johnson Construction Co., Fargo, N.D., may have one of the most unusual computer rooms in the country — a vault. When the company, one of the largest general contractors in North Dakota, installed its IBM 3/10 3/10 last December, the most convenient room available was a 12 by 14 ft fireproof vault. The vault was converted, redecorated and supplied with a special air-conditioning and heating unit.

"Although we weren't thinking of record security at the time," said the firm's Dennis Olson, "the room serves that purpose well. I have a secure feeling when the door at night, and I don't worry about fire or theft."



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Problems Centered in Software

(Continued from Page 1)

"The central theme of our program" at NBS, said, "is that the computer world of today is a world of services and not of equipment. The customers for computers are interested in the services their computer systems will provide.

"Their interest in computer hardware is secondary. So also is their interest in individual programs written for computers. Quality service provided so as to make American software comfortable with computer applications and products is our greatest need today."

Major Objectives

In line with national priorities, he said, the center has several major objectives:

- "The utilization and application of computer services and technology to improve the productivity of the major services areas of our economy."
- "The improvement of computer services so that they are better quality and are less costly. Less costly implies both that the customer pays less and that computer manpower is more productive."
- "Increased beneficial application of automation technology for society through greater reliance on the computer as the hub of versatile automation."

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"The development of performance guidelines and standards for computer products and services so that the computer marketplace is a better one for both buyer and seller."

David also called for quality control of software. "No one has yet paid adequate attention to software management in spite of the fact that it is through software management that a whole new dimension of efficiency is opened to the customers of computer services."

The absence of software validation services, she said, "has resulted in customers buying software without knowing the extent to which the software conforms to stated conditions and requirements."

She cited an example in the Federal Government. In fiscal year 1970, agencies bought 180 computer systems for which the vendor maintains a Cobol com-

piled. Under present procurement practices, 720 Cobol validations were required, assuming there were four bidders for each procurement. The average cost per validation of \$3,000 then meant a total expenditure of over \$2.1 million.

"Since there are only about 33 unique Cobol compilers maintained by computer vendors, the entire validation process could have been performed for about \$19,000—33 validations at \$3,000 each—or a savings of more than \$2 million," she said.

The center, David continued, has initiated an effort to determine the best means for instituting Cobol and Fortran validation services.

Measurement of hardware and software performance is another area the center is investigating, as well as seeking a remedy for computer hardware and software incompatibilities.

RCA Plotting Withdrawal

(Continued from Page 1)

The letter noted that on-order equipment will be delivered, but "it is recognized that some customers may wish, as a result of our announcement, to terminate their use of RCA computer equipment prior to expiration of present contracts."

The "soft support" question may be crucial, since many of the users interviewed by CW had virtual memory equipment in order. Without the Virtual Memory Operating Systems these machines would be much less useful. Apparently only one of the two systems has been completed.

Pending word from RCA, members were still in limbo. A few had ordered additional equipment immediately after RCA's going-out-of-business announcement, and there were rumors of RCA salesmen finally meeting quota.

Some users also said that they planned to convert their rooms to non-RCA equipment, though.

A number of RCA employees have told CW that resentment is building up in the plants. In an

effort to keep the division intact so that it will remain saleable, RCA has discouraged job hunting. Only those who have officially been laid off are being allowed to contact other divisions of the company, and recruiters from outside firms are still being kept away.

This situation may be resolved if and when RCA sells the division. Rumors on this subject are like muskies in July, but there has been no verifiable news.

In order to sell a working division, RCA has to keep workers. Industry sources have also speculated that the slow delivery of Saratoff's letter to users may stem from the desire to sell the division.

Hardware support remained the biggest and most immediate worry of users interviewed by CW. One large New England user had already seen four of his SES laid off, and another user in Missouri said he was thinking of hiring one or two of RCA's maintenance people if they were laid off.

Data Collection vs. Privacy Aired

(Continued from Page 1)

agencies; their bill would overturn at least part of the Menard decision.

Bible said the Menard decision prohibits state and local non-FBI data available would facilitate the "exhaustive" investigations conducted on people entering the "sensitive" gambling industry in his state.

The FBI's ability to provide centralized criminal records services in "non-law enforcement" cases must be restored," he stated.

The bills suggested by the Department of Justice were introduced by Sen. Roman L. Hruska (R-Nebr.) and Rep. William McCulloch (R-Ohio) and would affect only those systems funded in whole or part by the Law Enforcement Assistance Administration (LEAA). It is expected

this legislation's impact would be felt almost exclusively at the state and local level.

"The right of privacy increases in importance in direct proportion to government's ability to collect data. The growth of our population and the mobility of our people make data collection essential," McCulloch said.

"Yet, this should be done in a way that does not expose everyone's life to public scrutiny. On the other hand, the data collected must be kept so secret that it is not useful for its purpose."

"The individual about whom the information is collected must have access to such information so that he might insure its accuracy and completeness," he continued.

Under the bill, data collected may be used only for law enforcement purposes; it may not be made available to anyone else, such as prospective employers.

News Wrapup

IBM Awaits Freeze Clarification

ARMONK, N.Y.—As President Nixon's wage price freeze passed the half mark last week, IBM was still awaiting clarification of the order before determining whether its planned price increases would be allowed to go into effect on Nov. 1.

Officials at the Office of Emergency Preparedness, which monitors the freeze, said, however, that the new lease and maintenance rates would not be allowed under the guidelines.

Neither they, nor IBM, could state whether IBM would be allowed to raise the prices effective Nov. 16 when the freeze is due to be lifted. An OEP official said that would depend on what Phase II of the Nixon economic plan required.

So far OEP said it could not determine if any users have complained about the proposed IBM rates, even though IBM said it was negotiating contracts at the new rates.

At least one present user who would fight the new rates if IBM tried to charge them for the Nov. 1 to Nov. 15 period when the freeze would still be in effect.

NYC Investor System Seen Earning Millions

NEW YORK—A computerized money management system in the city's finance administration should enable the city to earn from \$3 million to \$5 million a year on city investments, according to Mayor Lindsay.

The Pool and Satellite Banking system permits the city to reduce noninterest-bearing bank balances and increase interest-bearing investments by an average of \$70 million to \$140 million daily, he said. By using the system, the city can write a check for \$10 million in the morning, knowing it won't be cashed until the next day, and can invest the amount for 24 hours and reap \$1,388.90 in interest, Lindsay said.

DP Studies Infant Deaths, Malnutrition Link

ROBINS AFB, Ga.—The relationship between malnutrition and infant mortality is being studied by the Medical College of Georgia using a computer here. Information collected previously on the deaths of infants just before and after birth will be used with extensive data collected during a study of nutrition which used biochemical measurements.

The use of Air Force computers falls under the Department of Defense Domicile Action Program aimed at helping communities in areas of pressing domestic problems.

Computer Played Role in H-Bomb: Teller

MINNEAPOLIS, Minn.—Computer calculations in 1946 indirectly led to the making of the hydrogen bomb, Dr. Edward Teller testified here recently. Although the computations were based on an incorrect theory, they were valuable in the development of the bomb because "without a complete exploration of your errors, you may not find the right way," Teller said.

Teller's remarks occurred at a patent trial in which Honeywell Inc. is contesting the right of Sperry Rand Corp. to the basic patent on the computer, which it obtained in 1964. Computers are so important that further development should be "by all means, including free competition," he indicated.

DP Seen Funneling Money to Injured Workers

NEWARK, N.J.—Computerization of paperwork involved in workmen's compensation claims is being considered by officials here in efforts to ensure that more of the money paid goes to injured workers instead of administrative purposes. A report by the Newark Star Ledger revealed that out of every \$1, only 58 cents goes to injured workers.

Following the report, which also cited the unavailability of information on fees paid to doctors and lawyers, Labor and Industry Commissioner Ronald G. Heymann said he is giving "serious consideration" to computerization as a tool to bring about improved administration.

In addition to tabulations on legal and medical fees, it was suggested computers could be used to assign cases to judges in an impartial manner.

Police Still Seek Murderer in Swindle

FARMERS BRANCH, Texas—Police are still seeking a man known only as Larry Patterson, wanted in the murder of Billy Cletus Barnes, who was beaten to death in the local Memorex office [CW, Sept. 29].

Police said Barnes never worked for Memorex, despite earlier published information.

An eyewitness to the slaying, and former Memorex employee, Robert A. Overton, described Patterson as a white male, age 38 or 40, Overton met with Barnes, who was unemployed, and "Patterson" in the Memorex office on a Sunday afternoon last August.

Memorex officials said the meeting was not authorized, and speculated Overton had made a copy of his key before terminating employment and turning in company materials.

Council Takes Risk, Odds Seemed Right

MILWAUKEE, Wis.—The Common Council voted to ante up \$23,500 to computerize issuance of reminder notices and warrants on overdue parking tickets in an effort to recoup an estimated \$500,000 owed the city.

Alderman Harold J. Jankowski called the effort "a calculated risk." But the odds must have looked right.

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LD 9

Users Discuss Keypunch Replacement

CW Forum Gives Users a Chance to Exchange Ideas

Users are always talking to each other, comparing experiences and swapping ideas. But most of these discussions take place over lunch or at a cocktail party—and the valuable information exchanged can't be shared by others.

To preserve such information, *Computerworld* last summer brought six users together to discuss keypunch replacement and taped the session. CW Staff Writer Edward Bride acted as informal moderator.

Although brand names popped up throughout the discussion, the purpose of the forum was to allow users to compare notes on keypunch replacement and not to evaluate specific makes of equipment. It was not feasible to have users of all the 28 makes participate.

Moreover, it should be remembered that each user's choice of equipment is based on his particular needs, so one man's dream system could be another man's nightmare.

Readers should also keep in mind that because the manufacturers are continually modifying their products, the features of some of the equipment mentioned



CW Staff Writer Edward Bride, left, talks with CW User Forum participants Lawrence Winslip, David Tierney, Everett Lewton, Robert Babin, Arthur Morley, and Samuel Noah. (CW Photos by Farmer)

have been changed since the forum was held.

To make the discussion as balanced—and as lively—as possible, CW invited users of a variety of equipment, two of whom were currently in the process of

evaluating keypunch replacement equipment.

The transcript ran to 90 typewritten pages, making it impractical to print it all in one issue as originally planned. The final decision was to eliminate several

interesting but irrelevant discussions on other topics and to print the rest of the transcript as a four-part series.

To make the material more readable, each of the parts has been divided into two sections.

Part I-I: How Users Decide It's Replacement Time

CW: When do you decide it's time to replace your keypunch equipment?

WINSHIP: In our case there was a general problem with data entry, and a lot of it involved trying to find trained girls. The work was piling up. The operators were working overtime. We started looking for solutions to the general problem.

TIERNEY: Keypunch operators are difficult to obtain, train, and retain. The work is monotonous. And card-to-tape runs are very expensive, especially when you consider that a card reader (IBM 2540) is 100 times slower than a 2400 tape drive. That alone is incentive to move on to something else.

Another consideration is that we have many applications which involve more than one card, for example, payroll. To get one payroll employee from a company onto our payroll requires 17 punched cards, and this gets to be a lot of drum-card changes. We felt that we could delete 28% of one (360/30) CPU which does little more than card-to-tape runs.

We felt we could get about a 30% overall throughput increase. We found ourselves farming work out, and this also was very expensive.

To round out some of the services we are offering at the bank, for example OCR, you have to have some way of handling rejects, and you can't do this with keypunching. Keypunching right now is loaded to the hilt, and they just can't take on any more than they have right now.

LAWTON: I think our main factor in looking for key-to-disk was to speed up our processing. We have many, many different types of transactions where we have to balance books going into the computer, and this was a problem that we thought we might be able to solve with key-to-disk. We were playing around about a year ago with key-to-tape, and we found that keypunch operators were hard to find, especially trained ones.

But our main factor was to try to speed up our processing. We have speeded up in some cases to two days where we can balance right on this key-to-disk equipment so that we don't have to do a pre-balance computer run.

CW: So far nobody's had cost as a prime factor.

LAWTON: We were hoping for a cost factor, but as far as I was concerned I was only hoping for it; and it proved out in

Meet the Participants

ROBERT BABIN, data input manager, American Mutual Liability Insurance Co. His installation includes a 360/40, an 800, an H-2200, 17 keypunches, nine verifiers, two Mohawk Data Recorders, three Honeywell Keytapes, and a Farrington 3030. He was one of the two users seeking more information to help him make a purchasing decision.

EVERETT LAWTON, manager of data processing operations, New England Power Service Co. His installation includes a 360/50, a 360/40, a 7010, two 1401s, a 1480, 22 keypunches and verifiers, and 16 Redcor Key-Logic (key-to-disk) stations.

ARTHUR MORLEY, assistant chief, Bureau of Analysis and Processing, Massachusetts Department of Corporations and Taxation. His installation includes a 360/40, a Univac 9200, and 113 keypunches and verifiers. He was the other user seeking more information to help him make a purchasing decision.

SAMUEL NOAH, manager of data processing, MBM Transportation Co. His installation includes a H-200/1250 and a Consolidated Computer Key-Edit eight-station system.

DAVID TIERNEY, systems engineer for hardware evaluation, State Street Bank & Trust Co. His installation includes a 370/155, a 360/50, two 360/40s, two 360/30s, 27 keypunches, 13 verifiers, and a CDC 915 page and document reader.

LAWRENCE WINSHIP, manager of data processing, GTE Sylvania Lighting Products. His installation includes two 360/40s and two Consolidated Computer Key-Edit systems (one with four stations and one with eight stations).

particular case. But that wasn't the prime reason.

NOAH: Cost did not enter into the picture here at all. Actually we didn't have to go directly from keypunch to key entry. We went from Mohawk key-to-tape to Key-Edit. The cost differential was very minor.

I considered the extra work pushed in the area of verification. We punched several factors into the cards, and when the data came off the tape and into the computer, it went through an edit run. We found that we were rejecting as many as 600 to 800 bills in one weekly billing period. Bills that didn't get through one week never got through until the next week, because there wasn't time to correct them and put them in the works. Now, with the ability to check the extensions at the time of entry, we can go back immediately and make corrections. We found that about 60% were keypunching errors. Those were done away with completely, because as soon as somebody hits the last key of the last field, you can see right away if it doesn't cross. As I say, that cost is a matter of a couple hundred dollars. We didn't feel that the cost amounted to anything.

MORLEY: I'm amazed to hear cost was not a factor. How could you go about

justifying the purchase or rental of this kind of equipment?

WINSHIP: Cost wasn't what set us off in looking for the equipment. But eventually you do have to cost justify anything you get. We took the cost of the old operation, the 029 and 059 equipment, the girls, the cards, and all the rest of it, and came up with proposals.

We felt that we could get a minimum of 20% better throughput. So we reduced operators from 15 to 12, and came up with an actual out-of-pocket saving on hardware and salaries. We then took that versus the implementation costs so that in a very few months time we could have our payback period. Now it's money in the bank.

TIERNEY: As a matter of fact, cost is one of our first considerations. We have to (and we are still in the process of doing this, by the way) prove that we can actually save the money we think we can save by going with key-to-magnetic, rather than keypunch. From the results of the study that we did we figured that on the equipment alone we could save \$8,000 a year.

As far as purchases, we figured we could save about \$11,000 a year on IBM cards alone. Now this is not counting storage and everything else that's involved.

On the salaries of people, we are going on the very conservative assumption that key-to-magnetic devices are 30% more productive than keypunch, and felt we could realize substantial savings. Now this is for part-time people; people we could eliminate. We found ourselves very top heavy with people especially on certain shifts, and that gets to be one of your greatest expenses. But you find out pretty soon that almost 50% of any operation—I don't care whether its key entry or just your data processing operation—is tied up in salaries of these people. If you can cut down on people you can save money.

CW: Did you say you actually saved \$8,000 a year on equipment?

TIERNEY: We felt we could, yes. As I say, these costs are still being analyzed. These are the figures that we have presented to our management, and have said, okay, here is our study, here are our figures, and here is how we felt we could save this money. Now you verify them.

CW: Mr. Lawton, did you have any problems justifying your equipment?

LAWTON: No. Of course, I had to sell this to my management. And, of course, it was on a cost justification. It was not the prime factor. We couldn't put a price on how many days we were going to save in processing but we felt that if we could break even, that we would be gaining. So I had my card cost, I took three-for-four (keypunch) operators, and got my cost as far as my help was concerned, and then the cost of the machines, and we broke even.

But my costs were quite high. [As of now] we have three Key Logic operators to five-plus keypunch operators. So it has proved itself very well. Card costs, of course, did come down. Machines we have returned 14 to IBM. They were the 029 variety, which is more costly than the terminal of the Key-Logic. I did cost justify, but only on an "even-Stephen" basis to my management, and they bought it.

NOAH: I didn't want to give the impression that cost did not have to be considered. Obviously, cost must be considered. What I was trying to bring out was the fact that there wasn't too much difference in cost between one system and the other. And we could get a lot more from the Key-Edit system in terms of verification. The 600 and 800 bills that

(Continued on Page 7)

How a User Decides It's Time To Begin Planning Replacement

(Continued from Page 6)

we had been rejecting on a Wednesday night when we did our billing alone would almost justify the system. I had no problems at all in selling it. Those 600 to 800 bills amount to about \$20,000. To say that I could get \$20,000 in bills out this week, rather than a week from Wednesday, made a big hit right away.

The actual cost difference was that we had to put another 4K in memory in the Key-Edit system because of the fact that we did not punch the data in the sequence in which we calculated it. That cost us \$165 per month [bringing the system cost up to \$1,650. But we were paying close to \$1,200 for the Mohawks, only we had seven of them where we have eight of the others. And we also had five keypunches, although we weren't using them all the time. One of them for programs. There is very little difference in cost there.

We were also told that eventually we would be able to go to a larger record then 80 characters, and that should make quite a difference too, when we can put more data into a record.

CW: How long did it take before you could go into this larger record?

NOAH: The equipment came in July last year. They had some problems installing it. Finally when it was installed, they had problems with the FDRs; they had to replace that. I don't know if it was damaged in transit or what. But it was October before we actually went on rental. So actually, we've been using it about 8 months, without the extended record [which became available in August, nine months after installation].

TIERNY: Trying to justify keypunch replacement equipment on cost alone is very difficult. For example, if you start matching key-to-disk equipment against keypunches you don't reach parity until 13 stations. And comparing key-to-disk equipment and key-to-tape equip-

ment you have to get about 14 stations [to break even].

Now the per-unit increment cost of key-to-tape is much more expensive than going key-to-disk. Each key-to-tape station has its own integral tape unit. This generates a lot more heat than a key-to-disk system where you only have one CPU, one tape drive, and one disk. You need a much more controlled environment, whereas with key-to-disk most of the time you can get away with normal room air conditioning, which I think is a plus.

Some people have found that key-to-tape equipment [is even slower than] keypunch equipment, because now you have your operators handling tapes, instead of cards. They're loading their programs with tapes. [There may be increased throughput with key-to-tape], but I think key-to-disk is even better.



Robert Babin



Everett Lawton



Arthur Morley



Samuel Noah



David Tierney



Lawrence Winship

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Part I-2

How Users Choose, Work With Vendors

BABIN: Why did the users choose the companies that they did? I put out 13 proposals and got back 11, and I narrowed them down to 5. There's got to be at least one thing about each of the users, why they chose the equipment that they did. It might help me make my decision.

WINSHIP: We first looked at OCR and would have preferred to go with OCR if we could. But we could not find enough data of any one specific type to pay for OCR. So we dropped that idea.

We looked at card equipment and if we were going to go that route we would have probably gone to one that punched into a buffer like the new 129s do. But we thought, why go that way when everybody else is going further.

In key-to-tape, we saw the problems that everybody had had with them.

Then we said, if we can afford it, we'll go with key-disk. We wanted to be able to see the equipment running in a user's environment. This ruled out some of the bigger ones that didn't have users yet.

We wanted workmanlike proposals from the vendors. We said, "Here are our exact specifications of our workload, now we expect you to come back with a proposal of what equipment of yours will do this job for us." This ruled out some.

There were other technical points, such as which characters are on the display and which aren't. We didn't feel this was too important because if you take a look at Infotex, Entrex, CMC, and all of them, you can find specific weaknesses on one, strengths on the same one versus another.

(Continued on Page 8)



Users Discuss How They Choose, Work With Vendors

(Continued from Page 7)

So we didn't really rule any of them out even though we did find some points that were stronger on some than others.

What it finally boiled down to was that we found one company that met all of our requirements. It had systems in and running, and users that would demonstrate them, had software that we could see and utilize, and was in our area for service. That's why we ended up going with Consolidated.

We didn't rule any out for technical reasons. And I think that is important from your point of view. The ones we looked at we found very capable.

LAWTON: We did the same thing. I think every one that we looked at was very capable and could have done our job. I think we based our decision mostly on the software package that Key-Logic offered.

BABIN: So, in other words, anybody can maintain the hardware, right?

LAWTON: I think so. Mostly I think we based our decision on the software package that was offered.

NOAH: I might have gone to Honeywell, but at the time I put the order in with Key-Edit, Honeywell could tell me off the record that it had a system coming, but they could tell me nothing whatsoever about what its ability would be, and what I could do with it.

Key-Edit already had a system installed. I didn't bother to go out and see a demonstration. I would have had to go to Canada to see one. But it appeared to be what I wanted. And as I said before, they were located just within a matter of a mile from me, and I couldn't see how they could sell the equipment if they couldn't service something that close to them. I have had no problems with service. I like the system very much.

TIERNY: I have found the same that you all have found, namely almost any one's piece of equipment will basically do

the job for you.

One of my prime considerations is that after getting the equipment into service, I do not want to have to go to someone who is located in another part of the country. This is one of the points I like about Key-Edit. They have a regional office right in Waltham. They have several installations, and, from reports that I have gotten back from folks who have it, [the service has been satisfactory].

BABIN: Yes, that's true. A lot of companies say, "We have technical assistance in the field from coast to coast." That means that they could have one man in Boston and one man in California.

NOAH: Key-Edit probably has the same problem other people have had in the past and continue to have. They are getting new engineers, and it takes time to break in engineers. If I can get hold of one of the old timers, I'm tickled. But I can't always get one of the good ones the first time. But I have never been down for

more than an hour.

TIERNY: I make a general rule as far as service goes: if they have a local man in here, and if he spends an hour at my installation and he can't fix it, I want him on the phone to talk with whoever he has to talk to to get it fixed. If he doesn't have it fixed in that second hour, I want a man on-site, and I don't care where he comes from, but I want that [system] up.

LAWTON: I agree.

BABIN: Then you're saying that it's proximity for you. If you were in New York or New Jersey, you wouldn't consider Key-Edit, you would consider somebody like CMC who's got many systems in New York.

TIERNY: I would like to qualify that. Proximity is a consideration, but proximity isn't always the answer. Maybe your local man doesn't know as much as you would like him to know. I don't care to have him come from here. Just fly him in here [within an hour].

CW: Mr. Winship, you mentioned that there were some problems with key-to-tape that could be eliminated with key-to-disk.

WINSHIP: I think basically the one that everybody ran into with key-to-tape was that you still had many girls doing the same job. They were all putting out separate tapes. Then you had many many tapes to put together, say, with your order-entry or distribution or whatever. You had to worry about your program storage, which is a real problem with key-to-tape. You had to load each one each time, either with the strip or by keying it in, whereas with key-to-disk you can load all your programs on the drum and leave them for evermore.

So your setup and your tear down specifically are much faster on the key-to-disk. I think it's where you get your greatest throughput increase, on the front end and the back end. It is not the keying because I think it is just as fast keying to a tape as it is to anything else.

BABIN: How do you differentiate between fact and that pie-in-the-sky that the vendors say that they can give you?

NOAH: I don't know how you can distinguish. As far as I was concerned, it was a gamble. I didn't realize at the time that there was as much software necessary for the system. They had a little trouble with the software, to get us on the air and operating. It was some of the software that they should have furnished us with on the purchase, but their priorities were such that they just never got to what we needed and what we wanted.

CW: Do you think it's necessary to visit somebody's installation and see something up and running, in order to be able to make a good judgment?

TIERNY: This is how I go about it. From any vendor trying to sell me hardware, I want names, telephone numbers of all his users that I might contact independently. I usually visit at least three of them, and I do not want the manufacturer alone. I want to talk to the user myself. And I'm not interested in seeing a demonstration at a manufacturer's plant. [Of course a demonstration at a manufacturer's plant is going to work, or he would be foolish to have invited you. When a manufacturer starts begging about contacting his installed accounts independently, that should be your first indication of a less-than-advertised system.]

WINSHIP: We are about the same. I don't feel we have to pioneer. They may have trouble selling the first one in the area, but that's their problem, not mine. So I prefer to see them run. And we did. We went out and visited sites.

Next week's installment will cover the various criteria used in choosing the number of stations and evaluating software and CRTs. The users will also discuss site preparation and the effect of this new equipment on work conditions and morale.

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Editorial

What Ever Happened To Our Sense of Humor?

Computer professionals tend to be alert people with a keen sense of humor. Over the years, they have been quick to make computers hum songs, play games, and print out friendly messages to visitors.

Yet many people hate computers because of the cold-blooded, humorless way they have been treated by a billing system, the only system with which they have had direct contact.

But suppose, when an error was reported, the computer wrote a letter something like this:

"My programmer has instructed me to apologize for any inconvenience we may have caused you. I am awfully quick, but I'm not very bright, and we ask you to be patient until this problem can be straightened out. Since humans are much better at solving this kind of problem than I am, my company has assigned John Smith to work with you. He may be reached by calling the toll-free number printed below. Thank you for your patience. Sincerely, Computer # 92837465."

Why, a computer that friendly might even get fan mail.



"Mr. Sarnoff, Where Are You?"

Letters to the Editor

How Many Makers Must Die Awaiting Consent Decree?

One little, two little, three little indians.... now that RCA has quit the business and has an initial write off before taxes of \$500 million, who will be next?

Please find enclosed current statements by Thomas J. Watson Jr., in *Dun's Review* (Dec., 1970), and current remarks by T.V. Larson, in *U.S. News and World Report* (Sept. 13, 1971), relating to the fact that the IBM 370 is just an interim computer system.

When computers in the federal government, aerospace industry, universities, scientific industries and government contractors are eliminated from the computer census, IBM has more than 80% of the total dollar value of installations and considerably more in the number of accounts and computer installed installations.

Many a customer in the data processing field will consider twice whether it should go with anyone other than IBM for computer plans during the next five years.

Several years ago, IBM wrote a major advertising promotion in the *Wall Street Journal* and 200 other newspapers throughout the country relating to the abnormal health of other computer suppliers within the data processing industry. A similar ad today would indicate that 80% have died or are dying.

We can only await the new IBM Consent Decree with the U.S. Justice Department which will decide the future of the data processing industry.

George S. McLaughlin Jr.
President

George S. McLaughlin Associates, Inc.
Summit, N.J.

Article Illustrates DP Does Not Use Computers

The article by Joe Hanlon about a man being dunned for a credit card that he did not receive [CW, Sept. 15] contains further substantiation of a statement by R.W. Reynolds, "The data processing industry does not use computers."

Imagine. Here we have a company with untold hundreds-of-thousands of credit card accounts that are being maintained with a punched card accounting system. With credentials like this, it's evident that our industry hasn't seen much progress since the census of 1890.

Isn't it about time we got off our

flashing lights, mega-page printouts, and installation firehoses? Our industry doesn't need more CDPs; it needs Soaps (State of the art processors).

When we learn to reduce manual data processing (handling, card dropping, status-symbol printouts, etc.), we can then concentrate on a few more important matters like pseudo-human responses to human requests.

Thomas J. Hartung
Santa Ana, Calif.

Reader Distracts Cards, Pays Cash for His Gas

Concerning Joe Hanlon's article [CW, Sept. 15]: Now there is a terrible example of what can happen if poor business practices combine with sloppy operations and incompetent management.

Sociology of Computing

The Saga of TGR: A Search by DPer for Identity

By Miles Benson
Special to Computerworld

Corporation B is a big company. There are lots of ways in which technical computing types can lose their identity in a big company. The computing employees of Corporation B decided to do something about it and formed the "Technical Group Representatives," organization and called it TGR.

Each programming group in Corporation B, and there were a lot of them, selected a member to represent it in TGR. TGR met every couple of weeks, on company time, with management's blessing.

TGR thought of itself as a horizontal communications link in the traditional vertical corporate organizational structure.

Many times, TGR cut through organizational rigidity to accomplish what could not have easily been done through the chain of command. Programmers worked together to solve mutual problems.

The old operations vs. programmer interoffice dilemma was handled via TGR. The smoothing ruffled features was a vital TGR function. Management decisions requiring technical inputs were routed through TGR. In-breath surveys were conducted by TGR. Programmers needed an emotional outlet to plug into found that safety valve in TGR.

Recommended reading lists for growth-oriented programmers were compiled.

It is obvious that credit cards which do not show the holder's address and photograph are insufficient for establishing the holder's identity, and therefore not suitable for fiducial business transactions.

The oil companies, however, are not concerned about this, since they can rely on the basic honesty of most consumers, and their ability to pass the cost of fraud and litigation along to these same consumers.

A very sad situation indeed, though not an unexpected one, if one considers the reputation of the oil companies.

Are you listening, Alan Taylor?
In the meantime, I am continuing my practice of paying cash for motor fuel.

Walter J. Samck
Combustion Engineering, Inc.
Windsor, Conn.

Optimum, a Fed Contractor

I read with interest the article on the Civil Service Commission ADP training program [CW, Aug. 25].

It was a considerable shock to us at Optimum to find no mention of the company or contractor to the Civil Service Commission.

In addition, the photograph of Victor Loubriel, a system consultant with Optimum, strongly found itself unwelcome, no proper attribution that he is an employee either of Univac or of the Civil Service Commission.

George O. Wise
Vice President
Optimum Computer Systems, Inc.

New York
The commission staff never mentioned the contract or the fact that Loubriel wasn't a federal employee. Ed.

After-hours seminars on technical topics were conducted, and a technical newsletter, open to contributions from all members of the Corporation B computing community, was published.

TGR members were pleased with their accomplishments. Corporation B programmers were better motivated. Technically, they were growing. Administratively, they were cooperating.

Those who published in the newsletter received special recognition for their efforts. Those who worked on commercial problems were looked up to as leaders by their peers.

There was even a TGR symbol. In one of the TGR executive sessions, when the TGR officers were feeling particularly pleased with themselves, they invented "Smockey the TGR." Smockey the TGR is immortalized in "The Saga of Smockey the TGR," to be published in a future "Sociology of Computing."

But something went wrong with TGR. Or rather, several somethings went wrong with TGR. TGR took a stand against establishing rigid standards for programming performance, at a time when management was pushing for those standards. Some TGR members became too aggressive in their dealings with management, and created some badly bent administrative tools.

And the innovative manager who had conceived and nurtured TGR left the company. He was replaced by one who went "by the book."

There was nothing in the book about TGR. And the once-prospering organization slowly found itself unwelcome, unappreciated and unprospered.

TGR died hard. The members still cared about identity, and communication. They had inertia and programmer morale on their side. But the new manager, determined to destroy the organization he considered it potentially dangerous, a cross between a militant student group and a labor union) had the weapon of funding on his side. And time.

TGR never really died; it atrophied. The members grew weary of fighting city hall. They joked about being "freedom fighters," but they weren't really fighters by nature.

Then the layoffs hit, and standing up for cause and belief in suddenly became a luxury few could afford.

The meetings became less frequent. No one wanted to run for president of an obviously mortally stricken organization. Even when TGR functioned, it couldn't accomplish what it proposed to accomplish.

And finally it was gone.

TGR, an attempt to solve the identity problem, became just another victim.

Viewpoint

Garbage-In, Garbage-Out is No Excuse For Bad Output

It has always been realized that the value of a computer system lies entirely in its output. In the early days, when computers were not trusted to be able to add 2 + 2 together (and when programmers often managed to make mistakes, so that it looked as though the computer was not adding properly) there were many calls of "wolf."

The Taylor Report
By
Alan Taylor, CDP



Some times some billing was produced, was presented to the client, and then was thrown back in disgust. "This bill does not add up. The computer can't handle it!" — were the cries that went up — and the computer designers found themselves under attack.

During the investigations it was found quite often that the input was wrong. Or, more to the point, the input had been sufficiently edited and could be blamed for the problems, in conjunction with the programming. The computer was able to be acquitted, and happiness reigned.

As a result of this, a defense against the "wolf" cries was originated. This was the famous Gigo defense, Garbage-In means Garbage-Out. As time went on the very phrase Gigo became part of the lore of computers, and was used whenever a computer operation was under attack. "You only gave us this data," said the programmers, "so you must put up with this report."

Not Always Wolf

However, as in many things where "wolf" is called, what had been overlooked was that there were times when the criticisms were valid. These were when the

output form itself, even when correctly computed in accordance with the programs, was giving invalid information. Such occasions did not trouble the programmers very much. They caused new systems analysis, with forms being re-designed, fields re-headed, etc. — but often not new programming. Small wonder then that the programmer tended to forget these areas. They did not concern his work.

Programmer Believed Gigo

The programmer tended instead to assume that the output only had to be as good as the input allowed. He did not consider it any part of his operation to bother about whether or not the input was adequate enough to support the output.

Now, of course, programmers are going to have to pay for this oversight. Because now the outside world, tired of waiting for our professional societies to establish real codes of conduct, or to be prepared to enforce them, has started itself. In New York the Attorney General is laying down quite specific rules that he wants to see obeyed by computerized (and all other) billing systems. It is interesting to see just what the Attorney General wants.

Missing Mailing Date Wanted

To start with, he does not want interest charged until 21 days after the mailing of the bill to the client. That is an interesting figure. Most of our billing systems currently do not charge interest until 25 days after their closing date. It suggests, therefore, that four days has not been sufficient for our fast computers to successfully get out the bills. It also notes that the computer programs have failed to ask for some vital input — the day when the bills are actually mailed.

Now, is this a Gigo case? Certainly the programs as currently written were apparently doing as well as they could on the one date.

to work with — the end of the cycle date. There is often no input that even says when the actual program run (the billing run) was executed, which could be much later than the closing date, never mind an input that says when the billing was actually mailed.

No Technical Difficulty

Not that there is any great technical difficulty in providing for the creation of these pieces of information. For instance, second date fields for program execution time could be provided within each data record, and part of the initialization and ending parts of the program could be to send out, in bill-like format, a punch card to actually go through the mails and then be returned to the computer system. (If you are afraid of losing the punch card in the mails you can end out three. Or, course if you are still in fear of losing it then you should not be using the mails for billing at all anyway!)

Gigo Not the Cause

So it turns out that there were two pieces of billing input missing. And this missing input was creating garbage-output — service charges which were not justified — even though the original

billing output was absolutely correct.

Was this a Gigo case? I do not think it can reasonably be said that the input was garbage. What was wrong was that the input never adequately supported the

Alan Taylor, consultant, writer, and former editor of Computerworld, is president of Computer Management Aids Corp. of Framingham, Mass.

output even in cases of perfect computation. Here we had a case of the garbage-output without needing the garbage-input.

Ligo? Lilo?

It looks as though we need another Gigo symbol. We could of course merely repeat the Gigo pattern, and come up with Ligo — for Lax Input = Garbage Output, or if you prefer it Lilo — Lax Input means Lying Output. But I do not really think that we should copy Gigo.

Let Output Lead

I think the key point that we have been missing is that while we may process from input to output, the real definition is whether or not the output is valid under any circumstances. It is therefore, necessary to take

the output first, rather than the input!

Taking the output first we will come up with some statement like "Valid Output Needs Complete Input," which does not seem to make a very nice acronym but which does give the real point. Perhaps, indeed, we will change it to a professional standard — such as Correct Output Needs Certified Input. That introduces a new part of the equation, the idea that the input should be certified as being usable to produce the output. Such a certification would be a technical task, and is something that our profession should work on.

And this I think is the lesson of the actions in New York State. I think we have got to change our concentration of attention from the Gigo alibi to look instead at the output question. After all, on the outside, it does not matter whether our computers accept garbage-in. On the outside — which is where the power is — they assume that our output is gospel — not garbage.

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Shift in CPU Use Seen

'B Schools' Seen Improving DP Curricula

By J. Daniel Couger
Special to Computerworld

A significant change in philosophy concerning computer use in U.S. Schools of Business has transpired over the past five years. The writer's original study, *Computers and the Schools of Business* (1967), described the approach of 11 progressive schools which had implemented four phases of computer curriculum.

A survey last year revealed that the four phase curriculum has been implemented in the majority of the 139 members of the American Association of Collegiate Schools of Business.

A recent study by Professor Roger Gupta (Kent State University) shows that the majority of the other U.S. schools now require an introductory course in data processing — phase one of the four

Couger on Education

This is the first of a regular monthly series on education by J. Daniel Couger, Professor of Computer and

Management Science at the University of Colorado. He serves on the ACM Information systems curriculum committee and the American Association for Junior Colleges. He has been a curriculum consultant to more than 30 universities and colleges.

Couger edits the *Computing Newsletter for Instructors of Data Processing*.



phase curriculum.

Yet, the significant change is not the spread of computer curriculum from a few progressive schools to the majority of the 600 U.S. Schools of Business in the brief, five year span of time.

The significant change is the way in which the computer is being used. Five years ago it was used primarily as a problem solver — on rather trivial problems. It was also used for faculty research. During the next few years it continued to be used as a problem solver, but on increasingly complex problems. And, it was being used for student research as well as faculty research. Today, the progressive instructors are using it as an aid in teaching management subjects. Also, joint faculty-student research projects are the trend.

However, at the college/university level, we are now distant away from instruction by the computer. Development of these instructional programs will require huge resources, beyond the capability of a single school.

Nevertheless, some instructors have employed the computer to provide the student a truly synergistic learning experience. The total effect of the instructor and the computer is greater than the sum of the two taken separately.

This approach appears to be the primary thrust in computer use for the immediate future.

The AACSB Curriculum

The four phases of the computer curriculum now required by the majority of AACSB schools are:

- Coverage of computer fundamentals, systems analysis, and design and programming through a course required of all students in their academic program.
- Coverage of the applications of computers through incorporation of this material into the functional area courses, e.g., computer applications in finance in the finance courses, computer applications in marketing in the marketing courses, etc.
- Coverage of computer capabilities for abetting decision making in a dynamic business environment through computer-oriented business games.
- Coverage of integration and optimization of computer applications through a course on design and implementation of a sophisticated, computer-based management information system.

Better DP Training Needed in Australia

SYDNEY, Australia — Most people in this country's DP community are "forgotten men" in terms of technical training. This is the finding of Dennis Moore, director of the computing center at the University of Western Australia, who has recently completed a five-week nationwide survey of computer education, sponsored by the Australian Computer Society.

In a sweeping condemnation of the current state of affairs, he said, "Most programmers have been recruited within their firms. They've had relatively little computer training and there seems to be few avenues open to them to gain further professional training."

"There are virtually no opportunities for part-time education and in any case, it's unrealistic to expect (programmers) to study in formal courses in view of the sudden and frequent overtime demands made by employers," Moore continued.

To remedy the situation, he said the ACS should organize courses and examinations and encourage employers to allow employees to add some formal study to their normal workload.

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Random Notes

Ecma Okays OCR-B Subset; Ansi Studying Basic Font

GENEVA, Switzerland—The European Computer Manufacturers Association (Ecma) has recently issued 10 new standards, including one for OCR-B sub-sets for numerical applications, and another for conversational information transfer using the already approved Ecma 7-bit code.

The approval of the numeric sub-sets by OCR-B puts the European further apart from the American standardization effort which is still uncommitted on the basic OCR-B font. A spokesman indicated, however, that the American National Standards Institute (Ansi) study group for OCR-B is meeting this month.

Copies of the European standards are available without cost from Ecma at 114 Rue du Rhône, here in Geneva.

Teleprocessing 'Task/Master' Extended by Turnkey Systems
NORWALK, Conn.—Task/Master, a telecommunications monitor marketed by Turnkey Systems Inc. (TSI) has been enhanced to include three-level message queuing, support of batch-like asynchronous applications and dynamic poll-list construction. New features also include expanded accounting routines and extended run-time option selection. As with earlier versions, the enhanced package is a turnkey system, ready to be transparent to the user. The updated Task/Master is available for \$20,000, from TSI at 111 East Ave., 06851.

UCC Adds CDC 6400 Capabilities For Scientific T/S Applications
DALLAS, Texas—University Computing Co. has made available more computing power for its scientifically-oriented users, through the use of a CDC 6400 located in Santa Barbara, Calif.

The new CPU is said to be more flexible than the Univac 1108s that make up the bulk of UCC's equipment, but Fortran programs can be transferred to the Santa Barbara center without recoding. Access to the CDC 6400 services will be provided on a national basis, UCC said from 1500 UCC Tower, 75222.

HIS Distribution Package Bows
WALTHAM, Mass.—The Management Information for Distributors (Midi) system, now available from Honeywell Information Systems, incorporates 10 subsystems covering marketing, financial management, operations control and product acquisition and control.

The modular Midi is written largely in Cobol, and can be used on disk or tape. H-200 CPUs operating under either Mod 1 or OS/300 supervisors. The system is oriented towards use of a single data base for all areas being processed.

Zeta Plotter Software Available
OAKLAND, Calif.—New application software for civil engineers, land surveyors and photogrammetrists with access to a PDP-11 and the Zeta/EAI plotters, is available from Concept Computing Systems, 303 Hegenberger Road, 94621. Each plotting program would be tailored to the user's requirements and general prices cannot be quoted, a spokesman said.

IBM, Others Compete

More S/3 Services, Packages Offered

By Don Levitt
Of the CW Staff

IBM System/3 users continue to find new sources of support, and new support from old sources.

Anchor Systems Inc., New York, has conversion systems support and customized packages available for all the conventional applications areas. General Systems Inc., Mankato, Minn. has also announced packages covering payroll and general ledger.

IBM has added to its list of Field Development Programs (FDPs) with a package that converts RPG code on 80-column cards to RPG-III code on 96-column cards. Other new FDPs extend the brokerage back-office user for S/3.

Anchor Systems provides on-site "hand-holding" for users designing systems for operation on S/3 gear.

Anchor can also provide the facilities for card conversion of files, key punching or CPU-time for testing, debugging or "some production" before the user's system is installed.

The Anchor packages are for payroll, accounts receivable and payable, inventory, general ledger and sales analysis.

They can be fully customized, and warranted for two years, for from \$1,000 to \$3,000 each, the company said from 1372 Broadway, New York, 10018.

Card/Disk Packages

The General Systems packages are also customized and are available for either card- or disk-oriented S/3s.

The General packages are priced from \$500 to \$2,500 depending on the application and the version wanted. General Systems is at 500 S. Front St., Mankato, Minn. 56001.

IBM's FDP for RPG-RPG II conversion

handles source code from 360/20, 1130 or 1800 CPUs. It identifies unconvertible statements in the output with error identification in columns 90 to 96. It runs on the S/3-10 and is leased for \$30/mo for the first 12 months of use.

The new brokerage-oriented FDPs include an Over-the-Counter system that enables users to get current data on a firm's trading position, and a Margin Maintenance System. They operate on either S/3-6 or S/3-10 disk systems, and are available now for monthly charges of \$190 and \$300 respectively for the first 12 consecutive months.

'GMT' TP Control System Handles Transaction-Based Applications

DALLAS—A new teleprocessing monitor designed particularly to handle high transaction volumes, the Generalized Multitasking (GMT) control system from Computer Information Management Co. (CIM) can be used under either DOS or OS/360.

Terminal response times can be cut 50% to 70%, and throughput capacity of a CPU operating under GMT can be increased 200% compared to other monitor systems, the company claimed.

GMT supports all communication line types, most IBM equipment and several terminals from other vendors as well. The system can be modified to support other equipment, a spokesman noted.

The system is tailored by the user to include only the coding needed for his choice of terminals. A macro-generative facility is included so he can add the code for new equipment, or new core utilization, as his needs change.

User application programs can be written in Cobol or Assembler, with CALLS to GMT. Most on-line inquiry and data entry programs written under other monitors can be converted to operate under GMT, according to CIM.

The batch coding for GMT under DOS/360 requires only 28K bytes of storage.

The DOS version of GMT can be purchased for \$20,000 or leased for \$600/mo. The OS implementation is available for \$30,000 or \$900/mo. CIM is at 3707 Rawlins St., 75129.

Fortran Flowcharter Costs \$10

AMES, Iowa—A program that operates on large scale 360s or 370s to flowchart the logic of Fortran coding is available in card form from the U.S. Atomic Energy Commission Ames Laboratory for \$10, to cover reproduction costs. The package is also available on user-provided 7- or 9-channel tape for \$15.

The flowcharter will not accept any code except executable Fortran statements, so it cannot be used to chart programs in other languages. The diagrams it produces use close approximations of conventional flowcharting symbols, laboratory spokesmen said.

By making documentation easier to maintain than through manual methods, the flowcharter is viewed by the lab as an

aid to debugging as well as a means of providing hard copy descriptions of operational programs.

The flowcharter is written in PL/I and operates under OS/360, version 20. It requires 128K bytes of available main core and 128K bytes of bulk storage.

The program was developed as part of the master's thesis written by Jacqueline Stanek at Iowa State University. The thesis has been reprinted and is available as IS Report 2464 for \$3/copy from the National Technical Information Service, Springfield, Va. 22151.

Requests for the card or tape versions should be addressed to the Computer Operations Group at Ames Laboratory, Iowa State University, in Ames, 50010.

Tape Reel Numbers Used as Key Under 'Tracs' Library System

NEW YORK—Users of most CPUs that support Cobol have another tape librarian package to consider with the introduction of the Tape Recall and Control System (Tracs) from Datchron Corp.

Using tape reel number as the basic control, Tracs is said to prevent use of the wrong input tape for a job, to make unnecessary any physical reorganization of reels within the library area, and to control the number of "scratch tapes" an installation requires.

Tracs produces a daily update report which, the company said, is a map of the library. It lists in Job Name sequence the location, generation and retention of all tapes. Tapes are listed within job by order of date created for easier control.

A separate Scratch listing shows all tapes that should be removed from library control because of expired retention cycles. Librarians have the option of leaving the tapes in the library or releasing them to the operations staff.

Tracs also produces an inventory listing of all tapes, a retention analysis to show at what rate tapes are being used for new or expanded applications, and a master history tape which accumulates records of usage for each tape. With this, cleaning schedules can be predetermined to avoid read/write errors.

The Tracs package operates in a 35K partition or region under DOS or OS/360. The system has also been run on Honeywell and RCA Spectra CPUs, the company said. It requires two tapes and a disk file and sells for \$5,000. On-site training and installation assistance is included. Datchron said from 174 Fifth Avenue, 10010.

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User Forced to Phone Company

FCC Orders Independent Phone Co. to Interconnect

By Ronald A. Frank
of the CW staff

WASHINGTON, D.C. — The Federal Communications Commission has told an independent phone company it must inter-

connect customer-provided equipment to the Bell System network.

In a letter to the Central Telephone Company of Illinois (CTCI) the FCC said, "where a

customer requests interconnection of his equipment with your facilities for the purpose of interstate communications... you are obligated to permit the interconnection."

The FCC reacted to a complaint by Arcata Communications which had proposed the installation of a non-Bell PBX to be used for business communications.

According to an Arcata spokesman, the independent phone company refused to supply the required interconnection arrangement claiming it did not have an intrastate tariff to cover such service. The independent then offered the user the same equipment that Arcata had pro-

posed. If the equipment were installed by CTCI no access arrangement would be necessary the phone company told the user. To avoid what appeared to

be a long delay, the user accepted the CTCI offer.

At this point Arcata complained to the FCC that as a connecting carrier, CTCI was obligated to interconnect the user under tariff No. 263. The commission agreed and so ordered the phone company. An Arcata spokesman told CW that CTCI had "informally indicated" it would comply and interconnect

the user. Meanwhile the user was forced to get the identical equipment from CTCI.

The FCC in this case is whether an independent is required to interconnect customers even if it does not have a tariff. Apparently the FCC says they must. In its letter to CTCI, the commission said the phone company had to provide the necessary connecting arrangement "regardless of the language of your intrastate tariff." The letter added that if CTCI had no tariff rates, it would have to provide the necessary arrangement without charge.

CTCI officials could not be reached for comment on the problem.

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FCC Begins Inquiry Into Digital Methods On Microwave Links

WASHINGTON, D.C. — The FCC has initiated an inquiry into digital modulation techniques used in microwave services. The inquiry will affect users of data communications facilities.

A spokesman for one of the specialized common carriers told CW that it will be important for the commission to assure the most efficient use of the microwave frequencies when used for digital communications.

The FCC said that users and others with an interest in transmitting data by digital methods can submit comments by November 15.

Data Briefs

CCE Selects Data Channels Based on Control Signals

NORWOOD, N.Y. — Timeplex Inc. has introduced a Contention Channel Expanded (CCE) that is used with modems, multiplexers, and front and devices to increase communications efficiency.

The CCE selects one out of two or more full-duplex channels and connects it to a single data and control signal interface. The selection is regulated by the status of control signals at the interface.

The device is equipped with an EIA RS-232 interface for synchronous or asynchronous data up to 64K bit/sec, and can handle three control signals. A CCE system to handle six control signals is priced at \$230, without a power supply. Delivery is 45 days from 65 Oak St., 07648.

Wuds to 'Treat' Sick TTYS

MAHWAH, N.J. — Western Union Data Services Co. (Wuds) has introduced a "national health care program" for data communications terminals operated by its subscribers.

Users will be able to utilize the "Termicare" system by calling a special nationwide number which connects them with the Wuds facility here. Engineers at the Termicare center will maintain records on all TTYS installed by Wuds and will assist users in isolating their operating problems.

A spokesman said the service will apply to all existing and new terminal leases. Wuds presently supplies only Model 33 and 35 TTYS. A Model 33 costs \$65/mo, a spokesman said.

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Bits & Pieces

Card Readers Interface With Data Terminals

ARCADIA, Calif. — Western Telematic Inc. has introduced the CT series of punched card reader that can plug into 10-, 15-, and 30 char./sec data terminals for direct transmission of card information.

The CTA handles all three transmission speeds for data read from 80-column cards into 128-character ASCII terminals. The CTB and CTC provide 15- or 30 char./sec read rates in Correspondence or 7-level EBCDIC code for IBM 2741-type Selectric units. Connection of the CT units to the keyboard printer terminal is made through an EIA RS232C interface. Off line the reader/printer combination can be used as a card listing system.

The 30 char./sec units are priced at \$4,175, with lease prices ranging from \$135 to \$148 depending on options. An internal modem adds \$12/mo. Maintenance is included in most areas and delivery is 10 weeks. Western Telematic is at 5507 Peck Rd., El Monte.

IBM Adds Printer Feature

To 3735 Programmable Terminal WHITE PLAINS, N.Y. — IBM has added a printing capability to its 3735 programmable terminal even before the unit is delivered.

The 3286 printer was first announced with the 3270, which is IBM's upgraded CRT terminal system. The printer operates at 66 char./sec and is priced at \$180/mo., including required interface for the 3735. Purchase price is \$7,695.

The addition of the 3286 to the programmable terminal will increase the 3735 printing capability by more than four times, IBM said.

The 3735 system is scheduled for first delivery next April and the 3286 printer one month later.

Key-Edit Extends Buffer Feature WALTHAM, Mass. — Consolidated Computer has announced the addition of an extended buffer length feature on its Key-Edit data entry systems.

This option makes it possible for an operator to assign the record length required by the application. The feature is immediately available in two versions which provide the capability of keying data in fixed length records of 80 char. each or in variable length records up to 560 char. The feature is available in 100C systems at no charge, or \$200/mo. on other models. The firm is at 235 Wyman St., Q2154.

Key-Disk-360/370

Four Phase Adds 029/129 System

By Ronald A. Frank

or the CW staff

CUPERTINO, Calif. — Four Phase Systems Inc. has introduced the Data IV/70 key entry replacement system for IBM 029/129 keypunch and 059 verifier users.

Using keyboard and software enhance-

ments to its earlier 2260-compatible version, Four Phase has developed a source data entry system that can be priced as low as \$88/mo for each keystation. Data IV/70 includes a verification capability based on a "validation language" that includes all keypunch functions and adds a check digit feature, left zero fill,

six program formats, and key entry field generation of 35 predefined fields. The system can display up to 480 characters on CRT monitors using fixed or variable length record formats. In addition arithmetic compare operations including add, subtract, multiply, and algebraic notations can be entered and verified.

The key-to-disk system can be used in three configurations. Data can be sent directly from disk to a 360/370 multiplexer channel; data can be transferred from disk onto IBM-compatible 800 bit/in. tape; or the disk output can be transmitted via dial up lines to a 360/370 equipped with a 2701 port.

Both asynchronous and synchronous transmission modes can be handled. A full range of Bell data sets can be interfaced with the system at speeds from 110 to 2,400 bit/sec asynchronous or up to 9,600 bit/sec synchronous operation.

A typical system includes a processor with 12K bytes native storage with an additional 12K byte add-on module, 16 CRT displays and keyboards; a removable cartridge disk unit with controller; and an asynchronous data set interface. Purchase price is \$61,600 and monthly rental on a three-year lease is \$1,403/mo.

Four Phase is currently quoting 90-day deliveries with the first system scheduled for installation this month. The company is at 10420 N. Tantau Ave., 95014.

IBM Brokerage System Handles Key-to-CRT Stock Information

WHITE PLAINS, N.Y. — If you're a stockbroker who needs a system to communicate with stock exchanges and brokerage houses for security data, IBM has a 178-key terminal that can help.

Introduced as part of the 3670 Brokerage Communications System, the 3672/3673 executive console and CRT display can be used to handle a variety of stock-related functions. Through the use of special control keys brokers can access a specialized data base in IBM 360/370

the back office for transmittal to the customer.

The 3672/3673 can display 1,200 characters of information on a 9 in. screen which IBM says "assures the privacy of customer data."

Monthly rental for the terminal is \$62/mo. The control unit which can handle up to 24 displays and eight printers costs \$1,845/mo. Purchase prices are \$2,130 for the terminal and \$63,780 for the display.

The 3670 system uses OS with Team for remote access capability. Most IBM binary synchronous communication terminals can be used with the system and the 4872 modem or equivalent can be attached. First shipments are scheduled for fall, 1972.



IBM Stock Terminal

CPUs with 512K or more bytes of main memory.

Used in conjunction with the 3671 control unit and the 3674 printer, the CRT can display customer portfolio information, stock price historical data, current quotations, stock averages, and analyst opinions on specific securities.

In a typical operation a broker can accept a buy order by telephone, key in the customer's name, number of shares bought, etc. Confirmation of the executed order can be sent directly to the terminal and displayed while a copy of the transaction is printed by the 3674 in

PDP-8/e Users Get 1,600 bit/in. Tape System From Digitronics

ALBERTSON, N.Y. — Digitronics Corp. has developed a tape drive controller for the DEC PDP-8/e that can attach up to eight 1,600 bit/in. Digitronics tape transports to the mini. DEC does not offer a comparable packing density tape capability.

Described as the first controller in a series that will interface with widely used minis, the Model 1608E Tape Deck Controller consists of four plug-in printed circuit boards that mount directly into the PDP-8/e card slots.

The controller can interface with Digitronics 1610 and 1620 tape drives which handle IBM-compatible 800 and 1,600 bit/in., nine-track EBCDIC tape reels, a Digitronics spokesman said.

The 1608E controller is priced at \$2,500 on a 30 day delivery schedule. DEC offers an 800 bit/in. tape controller at \$3,000, a Digitronics spokesman said.

The 1608E controller can operate with two formatters, each with a capacity of

four tape transports. Standard DEC processor instructions including skip, command output, and status input types are used to operate the tape system. Digitronics is at One Albertson Ave. 11507.

Tri-Data Introduces 1000 Series Tapes

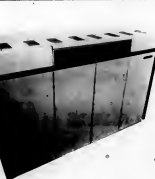
MOUNTAIN VIEW, Calif. — Tri-Data Corp. has introduced a new tape cartridge for use with 800 Cartridge mini-tape units. The 1000 series cartridges are available in lengths of 10-, 25-, 50-, and 150 feet. A 150-foot cartridge can store 3.24 M bits of data.

The cartridges are certified, error-free and are priced from \$12.50 to \$16 depending on length. They will be available in November from 800 Maude Ave., 94040.

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Terminals Can Be Dumped If Ultrafiche Suits Plan

NEW YORK — A new system, recently demonstrated here, could cut in half the time it takes a telephone directory assistance operator to find a phone number. Developed by Images Enterprises, Inc., Los Angeles, the system differs from others being proposed for the same job since it is "stand-alone." It does not require a computer to locate the information.

Since it eliminates the large and complex equipment normally thought to be required (computers, input terminals, and computer programming systems), the new system is expected

to cost only one-third to one-quarter as much as other approaches. In competitive trials it will show speeds equal to or greater than computer based systems, the company claims.

The speed advantage is clear when looking up a common surname: every major city phone directory has dozens of pages for each of the more common last names. Most computer systems display only the first page of the listing, leaving the operator to key the system a page at a time until the proper page appears. The ultramicronic approach is said to permit the operator to immediately locate within a page of the desired listing.

With ultramicronic, the firm is able to place as many as 8,500 pages of material on a 4 in. by 6 in. plastic card. Only one of the cards is needed to contain the entire Manhattan phone directory.

With the system, it is expected that the operator will be able to locate the desired listing in about half the time it now requires. The proper page will be reached in under three seconds.

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CI Notes

SDC Joins Terminal Race

SANTA MONICA, Calif. — Officials at System Development Corp. here have taken the plunge and fully committed the firm to entering the programmable terminal market — the first non-software or systems venture for SDC.

The firm's programmable terminal, which is up and working, although under heavy guard, here, will be based on the Nova 1200 minicomputer and the basic configuration will include a low speed printer, a high speed printer, CRT, and standard tape drive.

The unit, which will be announced officially soon, will be displayed at the Fall Joint Computer Conference. The price tag will range from \$40,000 up.

You Can Win!

MELVILLE, N.Y. — Potter Instrument Co. and IBM have settled a patent infringement suit in an agreement that calls on IBM to pay Potter almost \$3.8 million.

Under the agreement, the two will exchange nonexclusive licenses to patents and IBM will make an immediate payment of \$1 million plus annual payments of \$550,000.

IBM "maintains an interest in a number of Potter patents for possible use in present and future products," IBM spokesmen said.

Honeywell Realigns Operations

WALTHAM, Mass. — All Honeywell Keyplex and Keytype operations are being moved to plants in this area, freeing the firm's San Diego, Calif. operation to manufacture components and assemblies for the 6000 series of computer built in Phoenix, Ariz.

The changes, which began Oct. 1, will be completed by the second quarter of 1972 and will involve some layoffs and transfers, although the firm gave no firm numbers.

Supershorts

Datamedia International, Inc. producer of portable punched voting devices, has accumulated a \$1.3 million backlog for its products — a 300% increase over its \$300,000 backlog at this time last year.

Computer Applications Company, Ltd. of Tokyo has signed an exclusive marketing agreement with Informatics Inc. to market and support the Mark IV File Management Systems in Japan.

A letter of intent to supply New York City's Off Track Betting Corp. with D-112 MSI Minicomputers has been received by Digital Computer Controls, Inc.

University Computing Co. is entering Australia through the acquisition of an interest in Computel Ltd. of Sydney, which has a Univac 1108.

Clasco, Inc., a vocational education and computer products firm, has been designated as administrator of \$784,000 in Federal grants obtained under the National Defense Student Loan and the College Work-Study Programs.

Week Two

RCA Division Seen in 'Holding Action'

By a C.W. Staff Writer
MARLBORO, Mass. — The management of the RCA Computer Systems Division here apparently spent Week Two after the announcement trying to hold the operation together.

Meanwhile, in New York Thursday, an RCA corporate spokesman confirmed that "preliminary discussions" at the top management level were under way with "several" companies that had approached RCA concerning disposition of its computer business.

Control Data Corp. was one of the companies with which RCA has had discussions, he said, but Memorex was not, at least at the top management level. After laying off more than 2,000 employees in the first week, reportedly to bring overhead in line with revenue, the computer division's management began a strong holding effort to dissuade other employees from leaving. The purpose of the campaign was to keep the division a nice, neat package for sale.

In its efforts to hold the division together, RCA management insisted that personnel continue to work normal hours. While laid-off employees were being given assistance in finding new jobs, it was reported that other personnel were forbidden to use company time and equipment to prepare resumes or to seek other jobs.

The actions wouldn't be unreasonable, one employee said, if RCA had guaranteed to continue the employment of these people. But, the employee said, most of them expect to be laid off by the end of October, if not sooner, so they are very resentful at not being able to start job hunting right away.

Employees also said they resented the fact that almost nothing was being put in writing. Except for a few memos, all communications between management and staff have been verbal.

Publicly, RCA has made no statements at all since the Sept. 17 announcement, although company spokesmen have confirmed reports of layoffs and certain other actions as they were taken.

One of the reasons RCA employees don't want to wait until they find out officially if they're going to be laid off is the tight job market.

It has been estimated that there are already as many as 10,000 unemployed technical people in the Boston area.

Some of the employees are in the unusual position of having two homes

because they transferred to Marlboro so recently. Now, before they sell the home where they came from, they want to look for jobs there as well as in the Boston area. But, although this situation may double their chances of finding a job without having to look for a new home, it promises to leave them in a terrible financial position if they are laid off before they have another job.

Many of the employees are particularly bitter because they joined RCA on the strength of corporate statements that RCA was going to stay in the computer business regardless of cost.

Industry Splits on RCA Plan To Drop Out of the Business

NEW YORK — Industry reaction to RCA's move to exit from the computer business is taking two paths: one group lays the blame squarely on the doorstep of IBM, while another group indicates that RCA never made a serious commitment to the business.

D.J. Gury, executive vice-president of Memorex Corp., recently mentioned as a possible purchaser of RCA's computer operations, said the move is due to the "impact of IBM's monopolistic position" in the market.

On the other hand, G.C. Probst, Univac president, indicated that he was not surprised by the move because, he said, RCA had never made the necessary commitment to the business.

IBM's advantage in the market "is financial," Gury said. He noted that "when challenged, IBM reacts selectively using the breadth of their product line to absorb the cost of retaliation in the threatened area."

The other industry sources, while agreeing that IBM offered formidable competition and noting that RCA probably made a wrong marketing decision in attacking IBM's strongest markets, said that RCA never made a real commitment to the industry.

They point out that RCA had poured about \$500 million into computers and that the firm estimated that it would take about another \$500 million to become successful.

"While \$1 billion might seem like a lot," one source said, "it has to be remembered that IBM spent several billion developing the 360 series. If RCA had really wanted to compete head on with IBM, it would have had to make that type of commitment."

The withdrawal of GE from the business a year before RCA seems to support the view of many that a company has to be heavily committed to the computer business to be successful.

New Cassette Design Bows

PASADENA, Calif. — One of the major problems of using cassettes in digital applications has been the building of reliable, accurate and inexpensive drives to handle the units.

But Bell & Howell has taken a new approach to the problem with the Model 240 digital cassette recorder which has a tape drive that is wholly external to the cassette.

The new design, according to Bell & Howell, makes possible a tape path similar to that of reel-to-reel tape transports with "precision tape guidance and positive tape tension control."

The 240 incorporates a mechanism that with a switch movement extracts a 2-in. loop of tape from the cassette's center opening and automatically loads the tape on an external capstan and precision guide assembly. Tape guidance and control is isolated from the tape holder.

Bell & Howell's unit is available in either single or double track models. Any operating speed between 2- and 20 in./sec. may be used. Dual operating speeds are available as an option.

Model 240 has a recording density of 800 bits/in. (EBCMA compatible) and a transfer rate of up to 16,000 bits/sec. It can operate at a 500 steps per second rate at 2 in./sec. in incremental mode and the drive system incorporates reel and capstan dc servo systems. Tape tension is sensed and controlled on each side of the capstan.

Optional accessories include: dual read/write speeds, dual gap read-after-write head, automatic tape cleaner, power supply, case, and local controls/indicators.

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Low Cost, Flexible—

For Small Firms, Small Shows Are Good

By Ronald A. Frank
Or the CW staff

A growing trend in mini-invitational shows may hold the key to a business upturn for many smaller peripheral companies.

Typically held in user-dense geographic areas, the invitational shows are easy to organize, require a minimum of cash and personnel commitment, and yield rewarding benefits in the way of user interest and follow-up orders.

Apparently begun about a year ago, the invitational show idea consists simply of several manufacturers getting together. They arrange to display their products at an afternoon-evening hospitality suite at a central site—usually a large motel on a

heavily traveled highway.

Sometimes an invitational show is coordinated by a manufacturer's representative and sometimes the firms themselves get together. Arrangements are minimal since all that is required is a suite reservation and arrangements for refreshments.

Scheduling Flexible

"Scheduling for these shows is very flexible," one invitational veteran exhibitor said. "We can cancel up to 10 days before the event if we decide to pull out."

Costs for the companies are low. Usually \$250 per exhibitor is contributed. And the invitation-only admittance based on pre-screened mailing lists assure that attendees will be bona-fide sales prospects.

Most exhibitors send out up to 1,000 invitations which normally produce an attendance of about 300 at the shows. "And we don't get those financial types that just come to snoop around," one exhibitor said.

Shows Pay Off

One peripheral firm, Western Telematic Inc. is convinced the invitational shows pay off. "The quality of interest is much higher than at the larger circuits," according to Ivor Ross. "Last year we toured five cities with our show and wrote orders for the next four months," he said.

Users seem pleased with the invitational too. It gives them a chance to see equipment up close and ask questions directly to sales or technical reps.

A leader in sponsoring OEM invitational shows is Century Data. The peripheral maker now schedules a regular tour of six cities each year for 10 firms with non-competing products.

"We aim our invitations at the system designer," a Century spokesman said. "They will have to make the decision to use and interface our product and we want to talk to them first hand."

Where will the invitational shows lead? Ross has a theory. "What is needed are permanent product exhibits, where prospective users can get hands-on demonstrations of equipment before they buy." Such permanent show places will be less expensive and more desirable for small firms than maintaining a large sales force, Ross said.

Senator Plans Bill For Central Stock Clearing Operation

CW Washington Bureau
WASHINGTON, D.C. — In the wake of congressional disclosures this past summer regarding thefts of corporate stocks and bonds, Sen. William V. Roth Jr. (R-De.) has asked the Senate to enact a bill that would establish a national depository system to transfer securities.

"The most basic need in the securities industry today," Roth said in introducing S. 2551 for Sen. John Tower (R-Tex.) and Edward Brooke (R-Mass.) and himself, "is for an overall total systems approach to the stock certificate processing problem."

While the long-range goal, as he sees it, is the certificateless society, the interim need would be satisfied by a national depository system which "would effectively reduce by 50% the present physical movement of securities."

Current depositories in operation, such as the Central Certificate Service of the New York and American Exchanges, "are hampered by incomplete bank participation and by separate member and nonmember record-keeping systems," Roth said.

The system he proposes "would be entirely compatible with the development of a machine readable certificate, if the industry should choose to embark in that direction."

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Boothe Backs Investment Tax Credit Plan

CW Washington Bureau
WASHINGTON, D.C. — A leasing company official has asked a House unit holding public hearings on President Nixon's new economic policy to restore the investment tax credit.

D.P. Boothe Jr., chairman of

the board and chief executive officer of Boothe Computer Corp., told the House Committee on Ways and Means recently that it cannot act too quickly to restore the credit, "a tool which has demonstrated its effectiveness in increasing our nation's

investment in new plant and equipment."

Boothe told the committee that the "United States continues to have the highest percentage of obsolete production facilities of any leading industrial country. While our investment in capital goods remains constant, our foreign competitors have continued to increase theirs."

He also said he strongly urged that the credit be tied to the actual useful life of the equipment. "As a matter of principle, it is the actual life over which the taxpayer will retain his investment in the property which should determine the amount of the credit he is to be allowed." The Internal Revenue Service has argued that the useful life assigned to property for invest-

ment credit purposes should be the same as the useful life assigned for depreciation purposes.

Boothe also said he would like to see enactment of the credit coupled with Asset Depreciation Range (ADR) rules currently under consideration. The ADR rules, however, are under attack by Ralph Nader and others as essentially being a government handout to big business.

Both the investment tax credit and ADR are completely different in their effect, according to Boothe. "The investment credit encourages and assists new investment by granting an immediate tax savings... The ADR should give rise to a gradual acceleration of the replacement cycle of equipment in American industry."

Univac Sets Distribution Center for Quick Service

CHICAGO — A new Univac worldwide distribution center, capable of supplying computer parts and equipment to any customer in the world within 24 hours, has been opened in Elk Grove Village adjacent to O'Hare International Airport.

The 100,000 sq. ft. facility has an inventory of more than 40,000 individual items, including computer parts, material supplies, tools and test equipment.

The center receives material from Univac plants in Roseville, Minn.; Salt Lake City, Utah; Bristol, Tenn.; and Utica, N.Y.

In addition to the Elk Grove facility which replaces one in Iliou, N.Y., Univac operates a European distribution center at Schiphol Airport near Amsterdam, Holland. Univac also operates a West Coast distribution center in Los Angeles, an East Coast distribution center in Moorestown, N.J., and about 1,500 smaller warehouses and storerooms throughout the world.

A Material Control System (MCS) on a Univac 1108 provides for automatic replenishment of stocks in warehouses in the U.S., Mexico, and Canada as they are depleted from supplying customers. This system is in the process of being extended to Univac warehouses throughout Europe.

Elk Grove uses a Univac 9300 to process all in-house parts movements. Input and output magnetic tapes are matched with those of the 1108 for processing work involving the major division files, including MCS, API, (Automated Parts Inventory) and FEI (Field Equipment Inventory). The FEI consists of a listing of every Univac cabinet and the commonly needed parts it contains. The Elk Grove computer updates inventory records, produces shipping documentation, and records all warehouse transactions.

A major function of the Elk Grove facility is the distribution of Field Change Order (FCO) materials, which include modification materials and engineering instructions made up into kits for Univac installations throughout the world. When details of a new FCO are received, the specifications are fed into the 9300 system. The resulting output indicates the serial numbers of systems and cabinets to which the FCO must be applied. Accompanying the documentation with each FCO kit is a punched card which is returned to the shipping point. This information is again fed into the computer's records to maintain updated data.

Orders are received at Elk Grove from Univac by telephone, Telex and mail.

Equipment for air shipment can be delivered from the center to O'Hare Airport within 15 minutes to connect with direct flights leaving for Amsterdam, Tokyo, Hong Kong or Sydney, Australia.

Stanford Research Plans Peripheral Industry Study

MENLO PARK, Calif. — Stanford Research Institute has initiated a multi-client-sponsored research program aimed at assisting companies in evaluating market opportunities in the field of peripheral equipment.

The computer industry as a whole is expected to surpass the military electronics market by 1980, SRI noted, and computer peripherals account today for more than 60% of the total (\$7.0 billion) computer market. Ten years ago peripheral equipment comprised 35% of the market.

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GE INFORMATION SYSTEMS

Trade Panel Urges Research Support For Specific High Technology Products

WASHINGTON, D.C. — A presidential panel, calling for government stimulation of economic growth and improvement of the technological capability "which largely supports our export performance," has already had a significant effect on U.S. economic plans, and if a number of its other recommendations are accepted could have profound effect on the computer industry in particular.

Two areas of EDP interest are research and development and trade with the Communist bloc. The panel's 1,900 page report, made public by President Nixon earlier this month, was actually in his hands a month before he announced his new economic policy. A number of the suggestions in the report formed part of the basis for Nixon's economic message Aug. 15.

The panel, headed by Albert L. Williams, chairman of the finance committee and retired president of IBM, said that it is vital for the U.S. to maintain strong technological leadership. "Technologically based products are the U.S.'s principal asset in increasing its exports and meeting import competition."

To help this country maintain

this balance, the panel recommends "a much higher level of government support for research and development directed specifically to industrial objectives, as is found in other countries. Such assistance should be based on priorities reflecting careful analysis of where U.S. competitive advantages lie."

A number of panel members, including James H. Binger, chairman of the board of Honeywell Inc., and Fred J. Borch, General Electric's board chairman, dissented. They said that the cost for such a program would be out of proportion to results achieved.

The panel generally concluded that the U.S. "must launch a vigorous export drive for the 1970's." One particular area for

export expansion is East-West trade, a thorny problem for computer companies.

The potential, according to informed reports and expert judgments, is that the Communist bloc can be a lucrative selling area for American companies.

The blue ribbon group said it endorses "the recent policy of permitting U.S. foreign subsidiaries to trade with the USSR, Eastern Europe and Mainland China in all goods not on the internationally agreed Cocom (Coordinating Committee on Export Controls) list."

But earlier this year, President Nixon helped bend the Cocom rules a bit by agreeing to an ICL sale to the Russians, which included a large scale 1906A computer.

'Renewed Interest' Seen For Commercial Testing

SAN FRANCISCO — While commercial applications of automatic test equipment (ATE) have lagged cautiously behind military applications, there has been a renewed interest lately. Fred Liguori, ATE branch head at the Naval Air Engineering Center, said here recently.

"Among the causes for what appears to be a revived interest in ATE," he said, "are: substantial reduction in system costs due largely to significant reduction in computer costs; the tremendous increase in the quantity of measurements required to test digital equipment; and the recent trend toward the acceptance of commercial grade test systems by many military users."

"The striking benefit of the system has been in making it possible to build new products or design new processes taking advantage of the new economies made available by computer

speed, accuracy, and analysis capability," David S. Kline of Hewlett-Packard claimed.

"The changed economies also makes possible more and better product assurance testing," which reduces costly field problems, he added.

The prospective user of ATE systems, however, "should recognize that to enjoy the benefits of these systems they must plan on a commitment to the support of the system," he stated. "Learning to use the system and adapting the system to the tasks requires skill, imagination, and hard work."

In conclusion, Kline noted "the computerized test systems have not only offered another step toward automation in measurement, but, when properly supported, have so changed the economics of measurements that it has opened up opportunities for new products and processes."

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DPF Sales Slide, 370 Leasing Planned

NEW YORK — Three major developments, including the purchase of IBM 370 equipment for third party lease, were reported to stockholders of Data Processing Financial & General Corp. at the annual meeting here recently. But the firm also announced lower first quarter results.

In one major move, the stockholders approved a change in the company's name to DPF Inc. and authorized the board of directors to transform DPF into a holding company by transferring substantially all of its assets to a new wholly-owned subsidiary.

The name change and transformation is aimed at "aiding the company in the data processing and finance fields through internal expansion and corporate acquisitions," ac-

cording to DPF spokesmen.

At the same time the firm announced slightly lower revenues and earnings for the first quarter. In the three month period ended Aug. 31, the firm earned \$1.2 million (31 cents per share) on revenues of \$11.7 million compared to a net of \$1.6 million (40 cents per share) on sales of almost \$12 million in the comparable quarter a year ago.

Financial

The firm's expansion program is beginning "to assume visible form" with the recently announced agreement with Marshall Industries calling on DPF to acquire a 70% interest in Marshall's Data Systems Division.

Royal Poppa, DPF president, said.

Poppa said that the firm also expected to purchase other equipment on a "conduit" basis from other firms in the DP field. Under this arrangement, DPF would agree to purchase equipment from a manufacturer who would retain the responsibility for administration, asset management, marketing and related functions for which the manufacturer would be fully compensated.

He said also that the firm would purchase IBM 370 systems to add to its lease portfolio. The firm, Poppa said, is currently negotiating substantial lines for credit "with commercial banks to finance its plans for Marshall Data Systems, "conduit" purchases, and investment in 370 equipment.

Peripherals for the OEM — Trends and directions in the tape and disk markets.

This is just one of the many subjects that will be covered as *Computerworld's* editors examine the entire OEM marketplace in a special supplement to be included in our Oct. 27 issue.

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Nickels & Dimes

Trading on the computer-based Nasdaq system operated by the National Association of Securities Dealers is running ahead of the volume on the American Stock Exchange and is roughly half of the volume of the New York Stock Exchange. Volume on Nasdaq for the week ended Aug. 13 totaled 27.1 million shares compared with 54.8 million on the New York Exchange and 13.8 million on the Amex, the association said.

\$\$\$

Syner-Data's loss for the year ended Mar. 31 was \$1.19 per share and the loss for the three months ended on the same date was 18 cents per share, not \$1.18 per share as reported in the Sept. 15 issue.

\$\$\$

Fabril-Tek Inc. has completed a financing arrangement involving a \$4 million sale and lease-back of its Edina, Minn., and Amery, Wisc., facilities. The leases will run for 20 years. The package, arranged through Northland Investment Co., "increases Fabril-Tek's working capital and will permit the company to accelerate development of new products," according to M.F. Mickelson, president.

\$\$\$

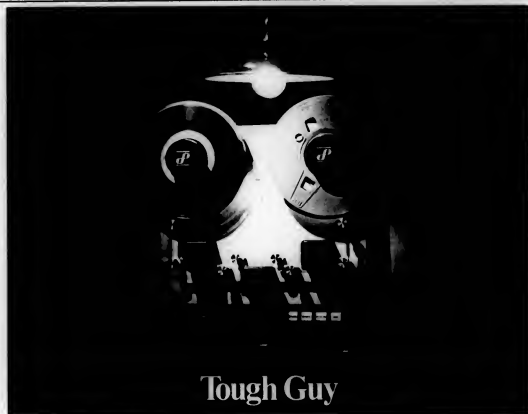
Computer Communications Inc. estimated that its total consolidated revenues for the year ended June 30 would be in the \$4.1 to \$4.3 million range, based on new methods of treating third party leases. The total loss will be between \$3.5 million and \$3.7 million. The firm has delayed its annual report while determining the treatment of third party leases. Under this new plan, the firm will not count the third party deals as revenue at the time of delivery and will recognize such revenues in income over the estimated lesser recovery period.

\$\$\$

Calcomp has completed negotiations to acquire an additional 27.5% interest in Century Data Systems Inc. for 396,555 shares of Calcomp stock valued at \$7 million. The transaction will bring the Calcomp interest in Century to 93.7% with the remainder held by employees of Century and initial investors.

\$\$\$

In the first time that the firm has reported on a quarterly basis, Eldorado Electrodata Corp. reported it operated on a "planned break-even basis" on sales of \$930,162 which amounted to a net income of \$697 in the 3 month period ended July 30.



Mark III knows how to make a dirty tape come clean. Fast.

Dust, oxide clumps, and microscopic junk have ways of working into magnetic tapes. What comes out are errors. Costly ones. Enter our hero: the Mark III Tape Cleaner. Most tape cleaners scrape tape over a straight-edge razor blade. Mark III is not that crude. Its patented self-sharpening rotating cylinder won't wear out, and won't cut your tapes. It shaves tapes and vacuums impurities away. The other cleaner that works that way is IBM's 3010 cleaner/evaluator, for thirty-five thousand dollars. Mark III goes for \$2300. In one library, Mark III

saved the company \$15,000 yearly in computer time. We know 500 other examples, too, where Mark III more than pays for itself many times over.

Which is why computer users swear by it. They know how tough Mark III is on dirt, how gentle it is with tapes, and what a cost-saver it can be for you. You'll know, too, after a demonstration of Mark III's ability to make tapes come clean. Call for one.



DATA PRODUCTS

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New Registrations

SYS COMPUTER CORP., 17-25 Di Carville Court, Haverhill, Mass., a company primarily engaged in designing, assembling and marketing a special processor for use by original equipment manufacturers, filed to register 205,238 shares of common stock. Proceeds, at \$10 per share maximum, intended for expansion of marketing staff, working capital and other corporate purposes. The underwriter is Butler and Sherman, 1500 Walnut St., Philadelphia, Pa. 19102.

DIGITAL COMPUTER CONTROLS, INC., 12 Industrial Rd., Fairfield, N.J., a company primarily engaged in designing, manufacturing and selling small digital computers, filed to register 450,000 shares of common stock. Proceeds, at \$30 per share maximum, to be used to increase inventories of raw materials, work in process and finished goods, to expand its R&D program, and for working capital and other corporate purposes. The underwriters are headed by S.D. Fuller & Co., 28 Broadway, New York, N.Y. 10004.

DATA GENERAL CORP., Route 9, Southboro, Mass., a company en-

gaged in the design, manufacture and sale of small digital computers, filed to register 450,000 shares of common stock. Proceeds, at \$48 per share maximum, intended for general corporate purposes. The underwriter is Bache & Co., Inc., 100 Gold St., New York, N.Y. 10038.

ITEK CORP., 10 Neagard Rd., Lexington, Mass., filed to register 34,843 shares of common stock to be offered for public sale by certain shareholders at \$28.875 per share maximum.

COMPUTER DESIGN CORP., 12401 West Olympic Blvd., Los Angeles, Calif., a company that designs, manufactures and sells programmable and non-programmable electronic calculators, filed to register 448,319 shares of common stock. Proceeds, at \$20 per share maximum, to be used for working capital and other corporate purposes. The underwriters are Blyth & Co., Inc., 529 S. Spring St. and Mitchell, Jones & Templeton, Inc., 310 S. Spring St., both of Los Angeles.

ALEX COMPTON CORP., 37 Executive Drive, Danbury, Conn., a

company primarily engaged in developing, manufacturing and marketing computing systems for retailers, filed to register \$8 million of convertible subordinated debentures, due 1986. Proceeds intended for repayment of loans and additional working capital. The underwriter is S.D. Fuller & Co., 28 Broadway, New York, N.Y. 10004.

LOGIC CORP., 21 Olney Ave., Cherry Hill, N.J., a company that manufactures, markets and services computer data entry equipment, filed to register 477,301 shares of capital stock. Proceeds, at \$14 per share maximum, to be used for new sales and service offices, the balance for working capital and other corporate purposes. The underwriter is Levy, Messon and Co., 22 Light St., Baltimore, Md. 21202.

INTERNATIONAL COMPUTER PRODUCTS, INC., 603 North Dooley Road, Addison, Texas, a firm engaged in the design, development, manufacture and sale of computer and data communications equipment, has filed to register 150,000 shares of common stock at \$5 per share.

Earnings Reports

POTTER INSTRUMENT CO.

Year Ended June 30	1971	1970
Net Earnings	187,173	8,900
Revenue	30,510,700	35,426,193
Spec Cdn	90,566,000	1,094,365
Net Earnings	1,354,800	1,272,910
3 Mo Net Earnings	327,227	32
Revenue	8,649,000	9,725,192
Spec Cdn	96,566,000
Earnings	181,600	860,331

a-Based on income before special charge. b-Exception for income taxes not previously made pertaining to retained earnings of a Puerto Rican subsidiary distributed to the parent company upon liquidation of the subsidiary in June 1971. c-Settlement from legal proceedings with Management Assistance, Inc. equal to 49 cents a share in 1971 and 48 cents a share in 1970. f-Equal to three cents a share.

SCAN DATA

Three Months Ended June 30	1971	1970
Revenue	\$342,241	\$405,793
Loss	437,680	437,680
6 Mo Rev	\$81,646	\$101,042
Loss	\$80,514	758,379

MILOD ELECTRONIC

Three Months Ended June 30	1971	1970
Net Earnings	8,09	8.36
Revenue	2,347,000	3,802,000
Earnings	140,000	364,000
9 Mo Net Earnings	6,241,000	10,576,000
Spec Cdn	440,000
(Loss)	(93,000)	81,823,000

a-Based on income before special credit. b-Equal to \$1.18 a share.

COMPUTER EQUIPMENT

Three Months Ended June 30	1971	1970
Net Earnings	4.83	8.06
Revenue	5,707,000	5,508,000
Net Earnings	118,000	42,000
6 Mo Net Earnings	175,000	202,000
Revenue	11,080,000	10,552,000
Net Earnings	179,000	72,000
Net Earnings	320,000	34,200

a-Based on income before tax credits. b-Equal to 7 cents a share in the quarter and 13 cents a share in the six months, compared with 8 cents and 14 cents, respectively, in the like periods of 1970.

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Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, SEPTEMBER 30, 1971

PRICE												
		1971	CLOSE	WEEK	WEEK				1971	CLOSE	WEEK	WEEK
		RANGE	SEP 30	CHANGE	CHANGE				RANGE	SEP 30	CHANGE	CHANGE
		(1)	1971						(1)	1971		
SOFTWARE & FPM SERVICES												
Q	ADVANCED COMP TECH	1-4	4 1/8	-1/8	-10.0	Q	MOORE BUS. FORMS	36-42	37 3/4	-5/8	-1.1	
A	APPLIED DATA RES.	5-13	6 1/2	-1/2	-7.1	N	NADIA CORP	29-47	46 1/4	+1/2	+4.1	
A	APPLIED LOGIC	2-9	3 1/4	-1/4	-15.0	O	REYNOLDS A REYNOLD	37-63	61	+1/2	+0.8	
N	AUTOMATIC DATA PROC.	40-65	62	0	0.0	O	STANFORD REGISTER	17-23	16 3/4	-1/4	-1.1	
O	AUTO SCIENCES	3-8	2 1/2	-1/4	-15.0	O	TAX PRODUCTS CO	8-17	12 1/2	+3/8	+5.0	
O	COMPUTER NETWORK	21-37	17 1/2	+1/2	+27.5	N	UNICOR	25-34	26 1/4	+3/4	+2.0	
O	COMPUTER PROPERTY	5-11	5	+3/4	+15.0	A	WASHAM MAGNETICS	6-10	6 1/8	-1/8	-2.0	
N	COMPUTER SCIENCES	8-17	7 7/8	-1/8	-7.5	N	WALLACE BUS FORMS	18-26	22	1/8	+0.5	
O	COMPUTER TECHNOLOGY	5-13	6 1/4	-1/8	-1.1	COMPUTER SYSTEMS						
O	COMPUTER USAGE	5-16	7 1/4	-1/4	-3.3	N	BURRHOUGH CORP	105-140	134 1/2	+3/4	+2.8	
O	COMP AUTOMOT. RES.	6-15	8 1/4	-1/4	-10.0	N	COLLINS RADIO	12-20	13 3/8	+3/8	+2.2	
N	COMPUTING & SOFTWARE	24-45	24	-1/8	-4.4	N	CONTROL DATA CORP	46-85	56 3/4	+5/8	+7.7	
COMMERCIAL						O	DATA GENERAL CORP	131-65	58 3/4	+1 1/4	+5.0	
O	COMRESS	2-4	2 3/4	-1/8	-6.6	O	DIGITAL CORP CONTROL	4-24	17	0	0.0	
O	COMSHARE	4-8	4 3/8	+3/8	+9.5	N	DIGITAL EQUIPMENT	53-85	75 1/2	-7/8	-1.1	
O	DATA AUTOMATION	7-15	8 1/4	-1/4	-10.0	N	ELECTRONIC ASSOC.	5-9	6	-1/8	-1.1	
O	DATA PACKAGING	6-10	7 5/8	-1/8	-3.6	A	ELECTRONIC ENGINEER	5-10	8	-1/4	-13.1	
O	DATAMATION SERVICE	1-3	3	0	0.0	N	FORNARD	25-44	40 7/8	-1/8	+5.1	
L	DATARIM	10-15	10	0	0.0	N	GENERAL AUTOMATION	9-14	9 1/4	-1/4	-1.1	
FPM SERVICES						N	HEWLETT-PACKARD CO	30-55	44 5/8	+7/8	+4.3	
A	ELECT COM PROD	3-7	2 3/4	+1/4	+10.0	N	HONEYWELL INC	83-115	106 5/8	+1/8	+4.1	
A	ELECTRONIC DATA SYS.	50-85	65 5/8	-7/2	-13.1	O	INTERDATA INC	24-36	30 3/4	-1 1/4	-0.4	
O	INFORMATICS	1-3	1 1/4	-1/4	-1.1	N	NCR	53-60	54 3/8	-1/8	-7.7	
O	I.O.A. DATA CORP	1-3	1 1/4	-1/4	-1.1	N	NCR	34-41	37 1/8	-1/8	-1.1	
L	ITEL	10-15	10	0	0.0	N	RAYTHEON CO	27-46	37	+1/2	+3.1	
O	KEANE ASSOCIATES	6-11	6 1/2	+1	+2.5	N	SPERRY RAND	25-38	26 1/8	-1/4	+11.0	
O	KEYDATA CORP	7-13	7 1/4	-1/4	-3.1	SYSTEMS ENG. LABS						
A	MANAGEMENT DATA	7-13	7 1/4	-1/4	-3.1	N	VARIAN ASSOCIATES	8-18	15 3/4	-1/8	-0.4	
N	NATIONAL CSS INC	7-13	7 1/4	-1/4	-3.1	N	VICTOR COMPOTHEMER	11-18	15 1/8	-1/8	-5.7	
O	NAT COM ANALYSTS	1-4	1 1/8	0	0.0	N	WANG LABS	29-50	45 7/8	+5/8	+1.3	
O	ON-LINE SYSTEMS INC	1-4	1 1/8	0	0.0	N	XEROX CORP	95-121	115 1/4	+1/4	+1.3	
PLANNING RESEARCH						LEASING COMPANIES						
O	PROGRAMMING METHODS	16-26	16 1/8	-1/4	-1.5	A	BROTHIE COMPUTER	13-27	16	-1/8	-0.7	
O	PROGRAMMING & SYS	2-4	3 1/4	-1/4	-6.6	O	BRENNAN COMP.	2-4	2 1/8	-1/8	-5.5	
O	SCIENTIFIC COMPUTERS	2-3	3	-1/4	-1.1	O	COMPUTER EXCHANGE	3-9	2 7/8	-1/8	-17.8	
O	SIMPLICITY COMPUTER	1-4	3 3/4	0	0.0	A	COMPUTER INVESTS. GRP	8-14	10 5/8	-1/8	-1.1	
O	SOFTWARE SYSTEMS	1-5	3 3/4	0	0.0	O	DATA PRIC. F & I	11-14	12 1/8	-1/4	-2.0	
TBS COMPUTER CENTERS						O	DATA RESEARCH	2-4	2 1/4	-1/4	-1.7	
O	TOLLEY INTL CORP	4-9	5 3/4	+1/2	+8.5	A	TOL INC	5-13	7 7/8	-3/8	-4.5	
O	TRACOR COMPUTING	2-5	2 5/8	0	0.0	O	DEARBORN-STORM	24-44	40 1/4	+7/8	+5.5	
O	THOMSON INC	5-8	5 1/8	-1/4	-1.1	O	DPA, INC.	4-8	8 1/4	-1/8	-1.4	
O	UNITED DATA CENTER	2-7	5	+1/8	+35.3	A	GRANITE MCT	7-11	8	+1/4	+5.2	
N	UNIVERSITY COMPUTING	21-38	25 1/2	-1/8	-2.5	O	GREYHOUND COMPUTER	16-24	24	+1	+1.1	
AURS SYSTEMS						N	LEASCO CORP	2-5	5	-1/4	+7.6	
A	URS SYSTEMS	6-11	6	+1/4	+4.5	PERIPHERALS & SUBSYSTEMS						
O	VORTEX CORP	6-11	6	5/4	-2.5	N	ADP-SOFTWARE-HUNT	24-48	36 1/2	-1/2	-1.5	
PERIPHERALS & SUBSYSTEMS						O	ALPHAMEMIC INC	2-6	6	-1/4	-1.1	
N	ADDRESS-COMPUT-HUNT	24-48	36 1/2	-1/2	-1.5	N	AMER CORP	14-25	15 3/4	-1/2	-9.8	
O	ALPHAMEMIC	2-6	6	-1/4	-1.1	O	ANDERSON JACOBSON	3-8	4 1/2	-1/4	-2.8	
N	AMER CORP	14-25	15 3/4	-1/2	-9.8	O	ATLANTIC TECHNOLOGY	3-8	4 1/2	-1/4	-2.8	
N	ANDERSON JACOBSON	3-8	4 1/2	-1/4	-2.8	O	BOLT, BERANEK & NEWMAN	5-8	4 1/2	-1/4	-15.2	
O	ATLANTIC TECHNOLOGY	3-8	4 1/2	-1/4	-2.8	BOLTS, RAYMOND						
O	BOLT, BERANEK & NEWMAN	5-8	4 1/2	-1/4	-15.2	A	CALCOMP	8-17	7 1/2	-5/8	-7.6	
N	BOLTS, RAYMOND	5-8	4 1/2	-1/4	-15.2	O	CREDITONICS	1-3	3	-1/4	-20.0	
A	CALCOMP	8-17	7 1/2	-5/8	-7.6	O	CYBERCOM INSTRUMENTS	6-10	6 1/2	-1/4	-1.1	
O	CREDITONICS	1-3	3	-1/4	-20.0	O	COMPUTER EQUIPMENT	4-7	5 5/8	+1/8	+5.5	
O	CYBERCOM INSTRUMENTS	6-10	6 1/2	-1/4	-1.1	A	COMPUTEST	6-20	6 1/4	-1/8	-20.6	
O	COMPUTER EQUIPMENT	4-7	5 5/8	+1/8	+5.5	O	CONSOL COMPUTER LTD.	5-12	5	-1/4	-2.1	
A	COMPUTEST	6-20	6 1/4	-1/8	-20.6	A	DATA PRODUCTS CORP	5-10	5	-1/4	-4.7	
O	CONSOL COMPUTER LTD.	5-12	5	-1/4	-2.1	O	DATA RECOGNITION	3-8	5 1/4	-1/2	-8.6	
A	DATA PRODUCTS CORP	5-10	5	-1/4	-4.7	O	DATA TECHNOLOGY	9-15	9 3/8	-1/4	-7.7	
O	DATA RECOGNITION	3-8	5 1/4	-1/2	-8.6	O	DIGITRONICS	8-15	8 1/4	-1/2	-15.5	
O	DATA TECHNOLOGY	9-15	9 3/8	-1/4	-7.7	N ELECTRONIC M & M						
O	DIGITRONICS	8-15	8 1/4	-1/2	-15.5	O	FARM-TEK	8-16	8 3/4	-5/8	-6.6	
N ELECTRONIC M & M						O	GENERAL COMPUTER SYS	12-27	22 3/4	-1/4	-5.5	
O	FARM-TEK	8-16	8 3/4	-5/8	-6.6	N	GENERAL ELECTRIC	55-126	61 1/2	-1/2	-1.0	
O	GENERAL COMPUTER SYS	12-27	22 3/4	-1/4	-5.5	O	INFOTEK INC	23-48	22	-1/2	-2.2	
N	GENERAL ELECTRIC	55-126	61 1/2	-1/2	-1.0	O	INFORMATION DISPLAYS	5-8	4 3/4	-1/4	-5.0	
O	INFOTEK INC	23-48	22	-1/2	-2.2	O MANAGEMENT ASSIST						
O	INFORMATION DISPLAYS	5-8	4 3/4	-1/4	-5.0	A	MARSHALL INDUSTRIES	12-27	11 3/4	-1/2	-11.5	
O MANAGEMENT ASSIST						N	MEMORE	27-78	35	-1/4	-4.6	
A	MARSHALL INDUSTRIES	12-27	11 3/4	-1/2	-11.5	A	MILER ELECTRONICS	8-26	5 1/8	-1/8	-0.5	
N	MEMORE	27-78	35	-1/4	-4.6	N	MONITE DATA SCI	22-47	22 1/4	0	0.0	
A	MILER ELECTRONICS	8-26	5 1/8	-1/8	-0.5	O	OPTICAL SCANNING	0-18	8 5/8	0	0.0	
N	MONITE DATA SCI	22-47	22 1/4	0	0.0	O PHOTON						
O	OPTICAL SCANNING	0-18	8 5/8	0	0.0	A	POTTER INSTRUMENT	13-25	15 1/2	+3/4	+5.0	
O PHOTON						O	PRECISION INST.	7-12	11 1/2	+1/2	+1.5	
A	POTTER INSTRUMENT	13-25	15 1/2	+3/4	+5.0	O	RECOGNITION EQUIP	17-26	15 1/2	-1/4	-4.6	
O	PRECISION INST.	7-12	11 1/2	+1/2	+1.5	O	RECON CORP.	8-9	9 3/8	-1/4	-1.2	
O	RECOGNITION EQUIP	17-26	15 1/2	-1/4	-4.6	N	SANBORN ASSOCIATES	10-22	10 3/4	+1/4	+2.5	
O	RECON CORP.	8-9	9 3/8	-1/4	-1.2	O SCAN DATA						
N	SANBORN ASSOCIATES	10-22	10 3/4	+1/4	+2.5	O	TALLY CORP.	6-15	11 1/4	-5/8	-5.2	
O SCAN DATA						N	TELETYPE	8-16	9 7/8	-1 7/8	-15.9	
O	TALLY CORP.	6-15	11 1/4	-5/8	-5.2	SUPPLIES & ACCESSORIES						
N	TELETYPE	8-16	9 7/8	-1 7/8	-15.9	N	ADAMS-HILLIS CORP	12-19	12 1/4	0	0.0	
SUPPLIES & ACCESSORIES						O	BALTIMORE BUS FORMS	6-10	8	+1/4	+3.2	
N	ADAMS-HILLIS CORP	12-19	12 1/4	0	0.0	A	BARRY WRIGHT	7-13	6 3/4	-1/4	-1.0	
O	BALTIMORE BUS FORMS	6-10	8	+1/4	+3.2	A	DATA DOCUMENTS	15-27	15 1/2	-1/4	-4.6	
A	BARRY WRIGHT	7-13	6 3/4	-1/4	-1.0	O	DUPLEX PRODUCTS INC	8-10	10 1/8	-1/4	-3.2	
A	DATA DOCUMENTS	15-27	15 1/2	-1/4	-4.6	N	ENNIS BUS. FORMS	6-13	7	-1/4	-4.4	
O	DUPLEX PRODUCTS INC	8-10	10 1/8	-1/4	-3.2	O	GERMAN MAGNETICS	8-15	18 3/4	-1 3/4	-8.5	
N	ENNIS BUS. FORMS	6-13	7	-1/4	-4.4	O	GRAPHIC CONTROLS	6-15	12 5/8	-1 1/2	-10.8	
O	GERMAN MAGNETICS	8-15	18 3/4	-1 3/4	-8.5	N	SH COMPANY	76-125	122 3/8	+3/4	+1.4	
O	GRAPHIC CONTROLS	6-15	12 5/8	-1 1/2	-10.8	1320 27 310 17 24 1 8 15 22 29 5 11 8 26 2 9 16 23 30 7						
N	SH COMPANY	76-125	122 3/8	+3/4	+1.4	MAY JUNE JULY AUG SEPT						
BASE FOR EACH TRADING INDEX: 100 as of 3/1/68												

Earnings Reports

BOLT, BERANEK & NEWMAN
Year Ended June 301971 1970
Revenue \$16,571,500 16,072,100
EBIT \$1,280,800 1,333,500

Earnings (730,500) 252,300

a-Related by company, b-From continuing operations & c-From discontinued operations & a special loss of \$433,000, includes special items.

CALIF. COMPUTING PRODUCTS
Year Ended June 301971 1970
Rev End 44,650,000 27,616,031
Earnings 2,276,719 807,362

a-All equipment leases were accounted for on the operating method instead of on a total firm lease contract basis as in prior years.

charge, as in fiscal 1970. Also certain acquisition and litigation costs related to lease activity were included for write-off over a two-year period, rather than written off as incurred.

The company said that if these accounting changes had been made, earnings for 1971 would have been \$1,458,000, or 80 cents a share, on revenues of \$40,979,417. b-A loss of \$1,970,000 in 1970. Items not adjusted to reflect the above accounting changes.

COMPUTERMARKETING SERVICES CORP.
Six Months Ended June 301971 1970
Rev End 8,078 8,968
Revenue 1,370,000 1,249,889
Earnings 50,000 50,000DATA TECHNOLOGY INC.
Three Months Ended Aug. 311971 1970
Revenue \$4,120,000 \$3,895,000
EBIT 29,000 15,000EOP RESOURCES, INC.
Three Months Ended July 311971 1970
Rev End 6,09 6,09
Revenue 3,656,165 \$3,614,444
EBIT 23,528 28,533
Earnings 75,334 22,000

a-Based on income before minority credits, b-From sale on purchase of own stock, c-Income before minority credits, d-Equity to 10 cents a share in 1971 and three cents a share in 1970.

INFORMATION INTERNATIONAL
Three Months Ended June 301971 1970
Revenue \$60,130 50,257
Net Loss 108,021 153,607



If You Use DOS You Should Know All About GRASP.

Today there are over 300 DOS Users renting GRASP, from 48K 360/25's to 512K 50's.

It all started in England in 1968 when a programmer for Software Design Ltd. combined the concept of spooling — increased throughput — with the advantages of buffering — very modest requirements of core and disk. Since it was to be a “for-sale” program, it also had to be very easy to install and use . . .

If you don't spool ———

it is well worth considering. It will consistently increase System Availability 15 to 35%. This can mean reduced overtime for both staff and equipment, or it can mean the avoidance of purchasing more hardware to get more work done. With GRASP, you can be spooling effectively on 20 cylinders of 2311 and 4K of core, with no changes to existing programs or procedures, within 15 minutes of installation.

If you use POWER ———

GRASP will do everything POWER does and then some (see below) in less than ½ the core, ¼ the disk space. Benchmarks in which GRASP is made to look like POWER (don't let it look like GRASP — turn off the printer) will prove GRASP to be at least 10% faster than POWER. Over 150 former POWER installations now use GRASP.

GRASP

If you're going to OS ———

Even if you only postpone your transition to OS, you may find considerable savings in renting GRASP/II for the interim. The following capabilities of DOS-GRASP/II make it an attractive alternative to OS:

- i) F0: GRASP/II runs in a totally independent F0 partition. Three Batch partitions are available for User processing.
- ii) Load Libraries: All DOS programs (except MAINT) become self-relocating, executable in any partition. This includes IBM compilers, service programs, and User programs regardless of source language or overlay structure.
- iii) Dynamic Partition Balancing: GRASP/II continuously monitors the relative CPU usage of all partitions and will adjust the DOS priorities for maximum throughput. This will also prevent the shutting out of lower priority partitions in cases where a higher priority partition is substantially CPU bound.

Communications ?

The recently released GRASP/II Remote Terminal Systems makes communications to a variety of remote terminals completely transparent to the system.

The following devices are supported as remote terminals:

IBM 2770, IBM 2780, DATA 100, IBM 360/20,
IBM System/3, IBM 1130, IBM 360 Model 25 and upwards,
IBM 370 Model 135 and upwards, PDP 11

Inter-CPU facilities permit not only inter-DOS communications but also OS-DOS connection.

In addition to RJE support for EBCDIC, GRASP also permits 6-bit transmission providing the benefits of faster transmission on either private or dial-up lines.

For further information, write or call:



Software Design, Inc.

999 No. Sepulveda Blvd.
El Segundo, Calif. 90245
(213) 322-8540

In Canada:
Comserv, Ltd.
2400 Eglinton Ave.
W. Toronto 15
(416) 653-2313

• LOS ANGELES • NEW YORK • CHICAGO • DETROIT • MINNEAPOLIS • LONDON •

(212) 757-7498 (312) 325-8171 (313) 861-8111 (612) 925-3060